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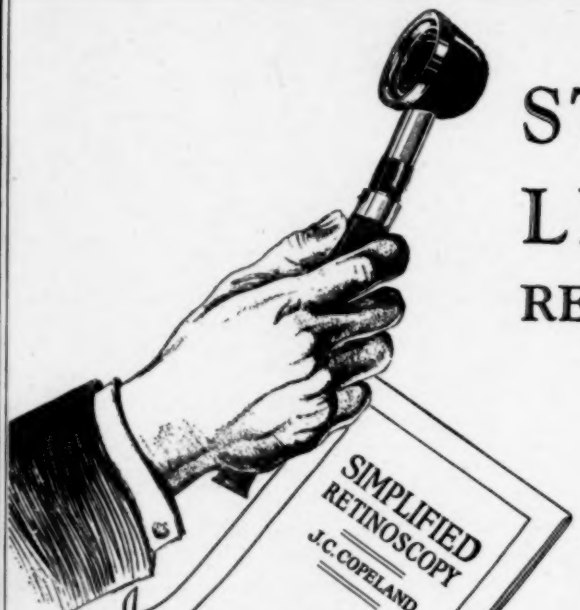

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THE CORNEAL SUTURE IN SENILE CATARACT EXTRACTION

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PRAGUE, CZECHOSLOVAKIA

Translated (from the original manuscript) by S. J. Meyer, M.D., Chicago

The author prefers the Liégard suture to that of Kalt; that is, the lower insertion of the suture is horizontally for two millimeters through the corneal tissue at the limbus, and the upper insertion is carried more broadly through the conjunctiva and episcleral tissue three millimeters above. The advantages of the corneal suture over the conjunctival bridge are that removal of the lens capsule is easier, that incision of the iris root can be more conveniently done, that wound closure is more secure, and that any tendency to vitreous prolapse is more easily dealt with.

Pavia and Dusseldorp[1] have recently described in this periodical the extraction of cataract under a conjunctival bridge, and at the same time advocated retrobulbar injection. The procedure of extraction under a conjunctival bridge is exactly twenty-four years old, and was first published by Pflüger[2] in the year 1903 with precisely the same technique as used by Pavia and Dusseldorp. The only minor, but not essential, difference is that Pflüger inserted the final suture somewhat further from the corneal margin.

I myself have performed extraction with the conjunctival bridge in a great number of cases, with the following experience: It is a fact, as mentioned by Pavia and Dusseldorp, that as a rule the postoperative corneal opacity is less than with the ordinary cataract incision. It is a fact that eversion of the conjunctiva or of the corneal incision cannot occur. I must remark here, however, that the danger of this complication in no wise justifies any complicated procedure of extraction of senile cataract. Among approximately five thousand extractions, which I have done without suture or conjunctival bridge, not once have I observed eversion or inversion of the conjunctival or corneal flap.

The conjunctival bridge does not prevent infection, as evidenced by the results of W. Czermak with his subconjunctival extraction. On the contrary, the more complicated the procedure, the greater the danger of infection. It is not greater (I have never experienced infection when using a conjunctival bridge) if only one extracts in a sterile operative field[3].

The conjunctival bridge does not prevent iris prolapse in extraction without iridectomy, but it may perhaps lessen the frequency. We so seldom have an iris prolapse even by normal extraction without iridectomy (not quite two percent)—in which I incise the root of the iris with the DeWecker scissors[4]—that I can give no statistical differences.

The extraction under a conjunctival bridge is much more difficult, especially with a somewhat contracted conjunctiva, in that the expression of the lens is naturally made harder. In my section on the cataract operation in the Graefe-Saemisch Handbuch, 1922[5], I have described in detail the procedure which is now recommended anew by Pavia and Dusseldorp. "To extract the cataract the lips of the scleral wound are pressed back with a Daviel spoon inserted under the conjunctival bridge, and the lens is brought out by pressure on the lower corneal margin with a second spoon." Very often, in cases where the conjunctiva was markedly contracted (after trachoma), and especially when I desired to extract without an iridectomy, I have had an assistant raise the conjunctival flap with small retractors to facilitate the extraction.

Personally, I have seldom prepared the conjunctiva beforehand according to the procedure of Pflüger, but I prepare the conjunctival bridge in the following way. As in the ordinary flap incision, the cataract incision is made

upward in the limbus and somewhat subconjunctivally, but when the sclera is cut through at the top of the wound the knife is not directed outward and the conjunctiva cut through vertically, but the knife is directed parallel to the scleral surface toward the equator, and by this means either the desired length or at least half the conjunctival bridge is made. Finally, it can be narrowed down from a twenty millimeter length to eight or ten millimeters by a series of snips with the scissors. A suture seems to me to be unnecessary. For further details, I refer to my article in the Graefe-Saemisch Handbuch, above referred to. Pansier[6] and Vacher[7], in 1899, had already described a similar method.

As a rule, I have not sutured the conjunctival flap when there was no prolapse of vitreous, whereas Pflüger placed a suture at either side. The conjunctival bridge is entirely unsuitable when vitreous of normal consistency presents during extraction. The iris above then as a rule remains everted when the operation is without iridectomy. It is difficult to make the subsequent iridectomy under the conjunctival flap or through a small buttonhole as recommended in my article above cited, vitreous remains under the conjunctival flap for a long time, and the inner wound therefore gapes. Even in myopic or exophthalmic eyes, where the conjunctival bridge formerly seemed to me most valuable, it is more an obstacle than an improvement. I have given up extraction under a conjunctival bridge since inserting a suture after the cataract incision in all cases which appear complicated and naturally when extracting the lens in its capsule.

For the past two years I have proceeded as follows: With a cataract knife the incision is made at the limbus, extending two fifths or more of the corneal circumference, in such a way as to leave at the top of the wound a conjunctival flap three millimeters wide and adherent to the corneal flap. The suture is then inserted as follows, as especially recommended by Barraquer. The conjunctival flap adhering to the cornea is grasped at the top with a fine surgical forceps (fig. 1), and a curved corneal needle armed with black silk grasped in reverse position in the needle holder, is inserted about halfway through the conjunctival flap from before backward, and then the equatorial lip of the conjunctival wound is grasped in a similar position with the forceps, pulled somewhat forward, and the needle carried entirely through it. The piece of thread lying between the lips of the wound is pulled to one side in a loop and laid upon the conjunctiva (fig. 2), and a single knot made, so that after extraction of the lens the suture can at once be tied.

The advantage of this suture lies in the fact that in case vitreous prolapses

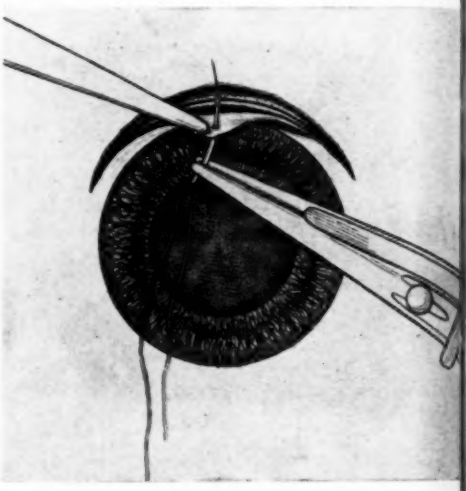

Fig. 1 (Elschnig)

with or after the lens a rapid closure of the wound can be made. The pressure under which the inner wound is hereby placed is materially greater than under the conjunctival bridge. If vitreous remains in the wound on each side, more sutures are inserted.

For the past two years, before every operation in which the eyeball is opened I have been using the retrobulbar injection of one c. c. novocaine with the addition of some adrenalin, first described by Pooley in 1914, later introduced especially by French ophthalmologists, and recently again warmly recommended by me[8], in the same way as is now recommended by Pavia and Dusseldorp. A subconjunctival injection of cocaine or novocaine in the region of the

later corneal incision appears to me unnecessary and hinders insertion of the check suture. Only for example in iri-

Fig. 2 (Elschnig)

dectomy in severely inflamed or painful eyes, in iridocyclitis, or in uncompensated glaucoma do I anesthetize the eye-

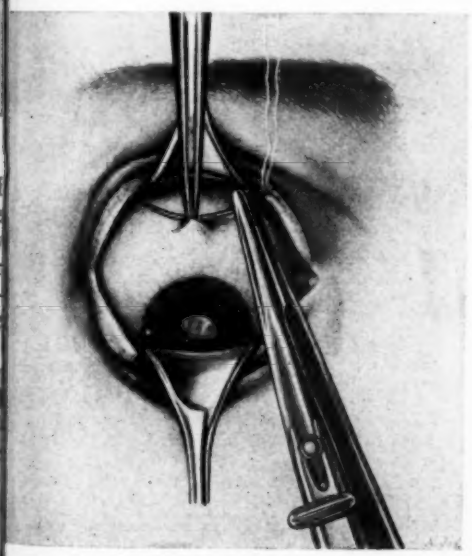

Fig. 3 (Elschnig)

ball by means of a second retrobulbar injection of 0.5 c. c. two percent novocaine solution outward and downward.

As I have shown in the article above mentioned, the frequency of vitreous prolapse is thus reduced to a minimum, and occurs only through faulty technique in the extraction of dislocated lenses. I have greatly simplified the technique for many years by the insertion of my check suture through the superior rectus (fig. 3). in every operation executed in the upper circumference of the cornea.

In the extraction of luxated or subluxated lenses, before making the cataract incision I always place a suture as recommended by Liégard. First a check suture is passed through the superior

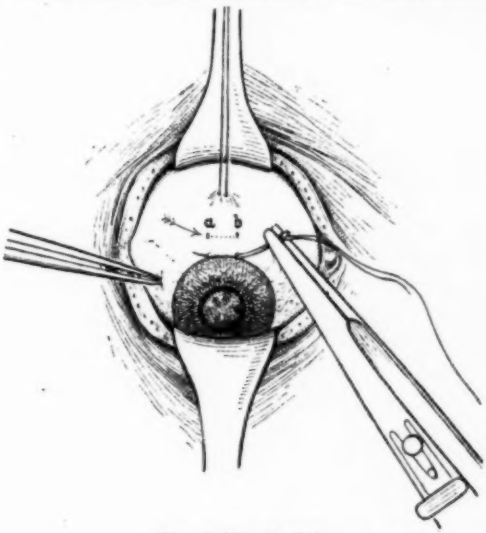

Fig. 4 (Elschnig)

rectus (in completely luxated lenses also through the other recti). The eyeball is then fixed toward the left side (on the left eye medial, on the right eye lateral) with the fixation forceps by means of the conjunctiva or the corresponding rectus tendon, and a fine needle carrying a double-armed black silk suture is inserted close to the upper corneal margin in the region of the marginal plexus in a horizontal direction for a width of two millimeters, through the superficial corneal layers. The second needle (or, in case only one needle is used, the same needle in the opposite direction) is carried through the conjunctiva and episclera three millimeters above the limbus in somewhat greater width and parallel to the first suture

(fig. 4). The loops of suture between the two attachments are left lying on the eyeball, the ends being provisionally twisted together. Then the cataract incision is made in the usual manner between the two suture insertions, and the further steps of the extraction carried out; the suture being tied immediately after its completion.

The Liégard suture appears to me to be superior to the Kalt suture used so much in France, as a broader area of the wound is covered by the loop of suture, and when vitreous prolapse occurs the wound closure is much better than with the Kalt suture. This closure is greatly superior in firmness to the conjunctival bridge.

As I have already likewise mentioned, application of a suture in the extraction of a cataract in the capsule, which we now do in all cases, and retrobulbar injection, are of enormous advantage. J. Kubik reported on this at the congress of the German Ophthalmological Society in Heidelberg, June, 1927, and was able to establish that out of 144 extractions in the capsule with round pupil there were noted only two cases of vitreous prolapse and six of iris prolapse, which were always covered with conjunctiva and were replaced on the fourth or fifth day after extraction. In the past two and a half years, we have had only one infection with loss of the eye preceded by 371 and followed by 598 extractions without infection.

To sum up again the advantages of the suture over the conjunctival bridge I shall cite the following:

1. Removal of the lens capsule with capsule forceps, and in fact all maneuvers in the anterior chamber and especially delivery of the lens, is considerably easier and is possible with less pressure than in extraction beneath a conjunctival bridge, especially when it is desired to extract the lens through a round pupil or in the capsule. Incision of the iris root, as to which I reported fifteen years ago[4], is much more easily and smoothly executed if the iris can be exposed by gaping of the wound.

2. Wound closure with the suture is much more secure both primarily and in the healing period.

3. In vitreous prolapse, the vitreous can often be pushed back into the anterior chamber by means of the previously placed suture. In any case, further vitreous prolapse is almost entirely and almost certainly prevented.

4. It is possible that when operation is done in a conjunctival sac containing bacteria, the chance of infection is increased by the suture. I have avoided this (although we now only operate when the conjunctival sac is sterile) by applying tincture of iodine five percent to the suture and the entire wound after completing the extraction[8].

5. On account of more rapid wound closure, wound rupture and iris prolapse should occur more rarely. The latter we shall almost surely prevent by incision of the root of the iris as advocated by me.

Upon the basis of my results, I now limit the use of the conjunctival bridge to the rare cases in which one eye is affected by degenerative corneal changes such as marginal groove keratitis, marginal groove degeneration, or marginal ectasia, and degenerative corneal changes in eyes with old glaucoma or after severe iridocyclitis. For such cases, extraction under a conjunctival bridge appears to be especially suited.

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SYNCHISIS SCINTILLANS OF THE ANTERIOR CHAMBER

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The eye had received a penetrating injury twenty years earlier, and had a hypermature cataract with ruptured capsule, and fluid vitreous. The anterior surface of the iris was sprinkled with quadrilateral crystals. Read before the Brooklyn Ophthalmological Society.

This is one of the rarest eye conditions but a large number of cases have been reported, considering the total number of cases. This is probably due to the fact that the diagnosis can be made without an ophthalmoscope and because of the rather startling picture of the typical case. The name was bestowed by Desmarres. Blasius in 1852 said that 24 cases had been reported up to that date, and of these there were 11 that originated from the lens, and 9 with the crystals in the anterior chamber only, but 5 of these had originated from the lens. Three cases were of doubtful origin. As early as 1830, the literature offers case reports, and in 1847 Stout examined microscopically crystals that had been withdrawn from the anterior chamber. But Becker two years later first actually showed that these crystals were cholesterin. Schmidt's report of the case generally considered to be the first is as follows:

"The anterior surface of the gypsum-like cataract was dusted with fine red, silver, and golden powder, and a layer of it a line thick covered the floor of the anterior chamber. If the patient made movements with the head, or if the eye was rubbed with the upper lid, the shining layer was scattered through the aqueous humor, to later settle down. As Barth made the corneal incision, the shining dust gushed forth with the aqueous and could be gathered upon a white card. With the aqueous escaped also the vitreous, and the eye collapsed."

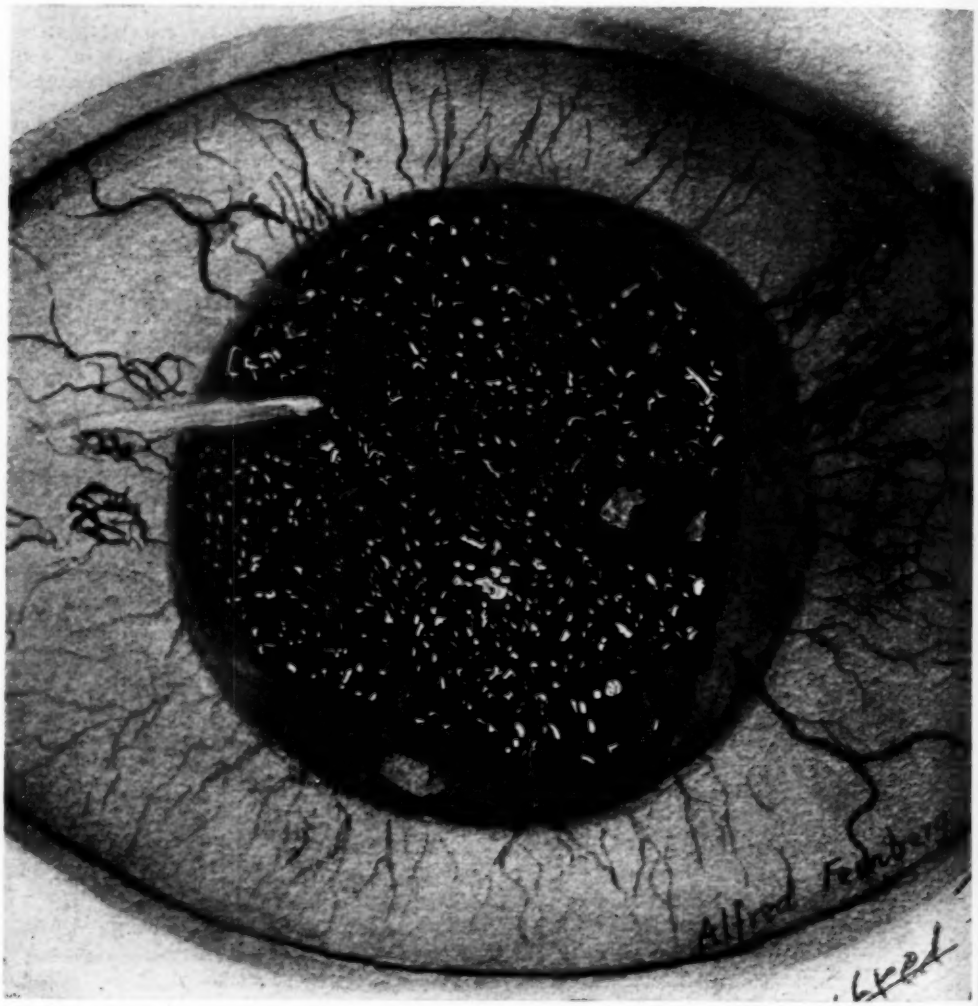
The shining particles from the vitreous and also from the aqueous have been examined a number of times, and the results are much the same, irrespective of the source. The early examinations mentioned have been supplemented by those of Bachstez, Sgrosso, Poncet, Jess, and others. Bachstez found fatty acids, fat, and lime. Sgrosso reports cholesterin, tyrosin and margarin, fatty detritus, carbonate and phosphate of lime, degenerated red blood cells, and pigment cells. Poncet found cholesterin crystals, tyrosin needles, and spherical phosphatic masses.

Jess also reports cholesterin and calcium compounds. Ginsberg and Cohen, in a case with a large mass of organized material in the anterior chamber set through with crystals, found hemoglobin in the iris and other tissues, which was construed to mean that the source of the crystals was blood. Bachstez suggests thyroid disturbance as a factor, Meesmann points out that the cholesterin content of the blood is high, and Westphal believes that the liver is an important factor in bilateral vitreous synchisis with normal vision. Sgrosso has recently demonstrated that the normal lens contains cholesterin and that this increases ten times when it becomes cataractous. Sparkling synchisis irrespective of its location is a degeneration product from old hemorrhage, exudates, long continued inflammation, or a cataractous lens. Its development in the vitreous is favored by vascular degeneration of senility, tumors, detached retinas, overripe cataracts, and the two rare diseases named after Coats and von Hippel respectively.

The anatomical arrangements of the anterior chamber do not often permit hemorrhagic or inflammatory débris to remain a long time; nor are tumors so common here as in the postlenticular space; nor is there any membrane, like the retina or choroid, to be detached and allow albuminous fluid, blood, or necrotic tissue to remain indefinitely in cystic spaces. For this reason, crystals in the anterior chamber are rare in any event, but when they do appear they indicate an origin elsewhere with later passage through the pupil or other opening. The most common source is

the lens, which is placed where its degenerated material, high in cholesterin content, may pass into the anterior chamber if the capsule is ruptured, if the vitreous is fluid and a communication between the two chambers is open.

which may or may not be easy to demonstrate. In some of these cases, after movement of the eye, the route of passage from the vitreous may be suggested by the visible movement of the crystals.



Synchisis scintillans (Lloyd).

Most of the cases have a history of old injury, a protracted iridocyclitis thereafter, and a blind eye. There is one other type of case wherein the crystals originate in the vitreous and pass into the aqueous. The lens capsule is intact, but a very fluid vitreous allows crystals to pass into the anterior chamber through an opening in the iris

Crystals which originate and remain in the anterior chamber are among the rarities and may be divided in two small groups. Ginsberg and Cohen, Seidl, van Moll, and von Szily have reported cases of the first type, characterized by organization of inflammatory products usually in the lower part of the chamber, studded with crystals which are found

to be very numerous on microsection. Some of these have been diagnosed as malignant tumors. The second type of case with origin and site of the crystals in the anterior chamber was first described by Vossius. In diabetes, he found iris pigment washed off and scattered on the anterior surface of the iris and the posterior surface of the cornea, and in the angle of the chamber. Low grade iridocyclitis after operations for cataract and during glaucoma gave the same result, and in addition to the inky black pigment particles scattered upon the iris were fine crystals. They were less numerous than in the other types and the vision was as good as 5/10 in one case. This is quite the exception with the other types of crystal deposit, wherein the vision is usually nil.

The case which is the occasion for this foray into the literature belongs in the typical group; blind eye from penetrating wound of the limbus, overripe cataract with ruptured capsule, fluid vitreous, and communication between the chambers. Twenty years ago, at the age of six years, the patient was struck in the eye by a stick and he remembers nothing else except that the eye was sore for a long time thereafter. It has been blind since the accident but has never been painful or red until recently. While fooling with a friend, this eye was struck, and it has since been tender, with circumciliary injection. There is a scar at the limbus at three o'clock, with the iris caught in the wound, resulting in a displaced pupil as far to the temporal border as is possible. The pupil is small and permits a view of the overripe shrunken lens. The anterior surface of the iris is literally sprinkled with shining particles which the slit-lamp shows to be quadrilateral crystals as bright as any mirror. They seem to be embedded in a vitreous membrane and do not move about freely when the head is moved. The color of the iris is good, but the eye is soft and useless and should be removed. But it is not likely that the patient will accept the advice given him.

14 Eighth avenue.

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SYRINGOCYSTOMA OF EYELIDS

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PHILADELPHIA

This lesion of the skin of the eyelids seems to have escaped previous attention by American writers. It is multiple, discrete, of pale skin color, flat, slightly elevated above the surrounding level. Clinically to be distinguished from xanthelasma and other conditions, it consists histologically of tracts of cylindrical epithelium with canals running through them, or with definite cystic cavities. From the Research Institute for Cutaneous Medicine, Philadelphia. Read before the Section on Ophthalmology of the College of Physicians of Philadelphia, January 19, 1928.

For a number of years, I have had under observation a disfiguring cutaneous disturbance of the eyelids whose description and significance appears to have escaped the attention of American writers. It represents a condition not simulated anywhere else upon the body except histologically. In this location it is commonly confused with other new-growths or with inflammatory and cystic dermatoses, while in its mild form or rather in the presence of but few lesions it is not uncommon. At times, certain of these lesions undergo epitheliomatous changes, morphologically at least, on which account, as well as because of their special localization and appearance, they should be regarded as a clinical entity.

Syringocystoma of the eyelids is seen both in the male and in the female but is much commoner in the latter. It generally develops after the age of twenty years and shows no tendency to spontaneous disappearance. It is most commonly situated on the lower eyelids

Fig. 1 (Greenbaum). Syringocystomas of eyelids, especially numerous on both lower eyelids.

in groups of two, three, or more lesions, but also occurs, though much less frequently, upon the upper lids. It appears in the form of small pin head and slightly larger sized soft discrete lesions. They are skin colored, only lighter, or perhaps slightly yellow, so that they stand out clearly from the surrounding normal skin.

They are not infiltrated, and the palpating finger merely finds that they blend with the surrounding skin or perhaps give a slight sensation of depressibility. They are flattened but appear in most instances to be slightly elevated above the skin level. Although this elevated appearance is lost on stretching the skin, the lesions themselves are not obliterated. On puncture one merely obtains a drop or two of blood. There are no subjective symptoms and the patient commonly asks for relief for esthetic reasons.

Fig. 2 (Greenbaum). Syringocystomas on both upper and lower eyelids (left). The large lesion is a chalazion.

Sections of tissue for histological study were removed in the case of the patient shown in the second photograph, and were stained with hematoxylin and eosin. (Serial section study no. 1). From the patient shown in photograph no. 3, the writer removed the lesion on the lower right eyelid, which was conspicuous by its size, firm, closely simulated what has variously been described as trichoepithelioma, benign cystic epithelioma, acanthoma adenoides cysticum, etc., and which

appeared to have developed from one of the usual types. (Serial section study no. 2.)

Fig. 3 (Greenbaum). Syringocystomas in Mulatto girl, about eight or ten on both lower lids. The large lesion on right lower lid had the histologic appearance of benign cystic epithelioma.

Serial section study no. 1: The epidermis was found more or less intact throughout. Most of the changes were in the dermis and more particularly in its superficial parts. These changes consisted in the presence of epithelial tracts, the cells of which were polygonal or elongated, and sometimes only consisting of two or three rows of cells looking like sweat-gland ducts but without a lumen. In these at some point centrally or peripherally or occupying almost the entire epithelial collection were round, oval, or irregular cystic formations in whose cavities one frequently found a pale and occasionally a bright pink staining granular or homogeneous hyalin material. In some of these epithelial tracts, which varied in shape and in some instances were branched, only slight cystic development was seen; in

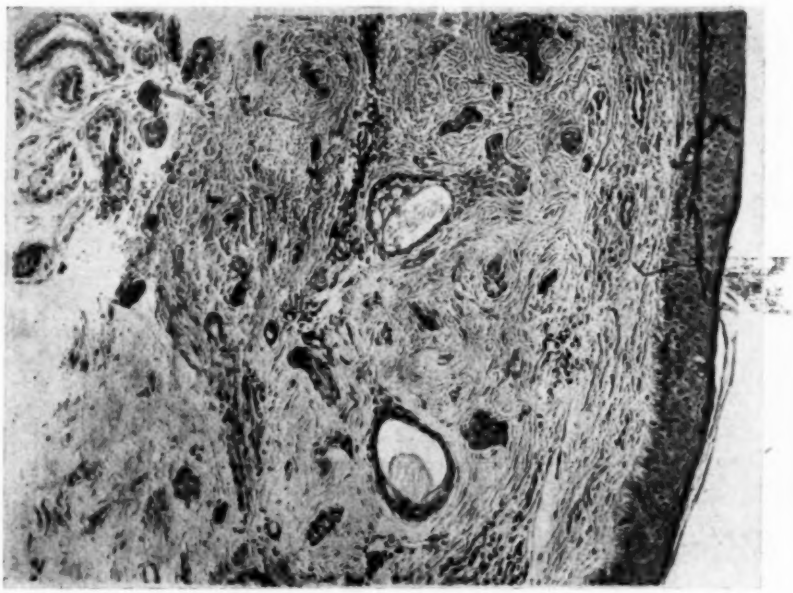


Fig. 4 (Greenbaum). Low power section from study 1. Epithelial tracts with cystic cavities containing granular material.

others almost the entire collection of epithelial cells was replaced by a cystic cavity and the remaining cells were markedly flattened to form a rim, one, two or three cell-layers thick. This rim was at times thicker at one side than at the other. The cystic cavities were in some instances subdivided into two or three smaller cavities by septa which appeared to have resulted from a confluence of epithelial cell walls. The vessels were not affected. The term epithelial cells which in their arrangement looked nevoid. This mass was located in the dermis but the epidermis over it was thinned due to pressure and it was subdivided by well formed fibrous septa.

Other sections showed epithelial cell collections with and without cystic change, but all were surrounded by a more or less marked connective tissue capsule. A definite relationship seemed to exist between the hair follicles and

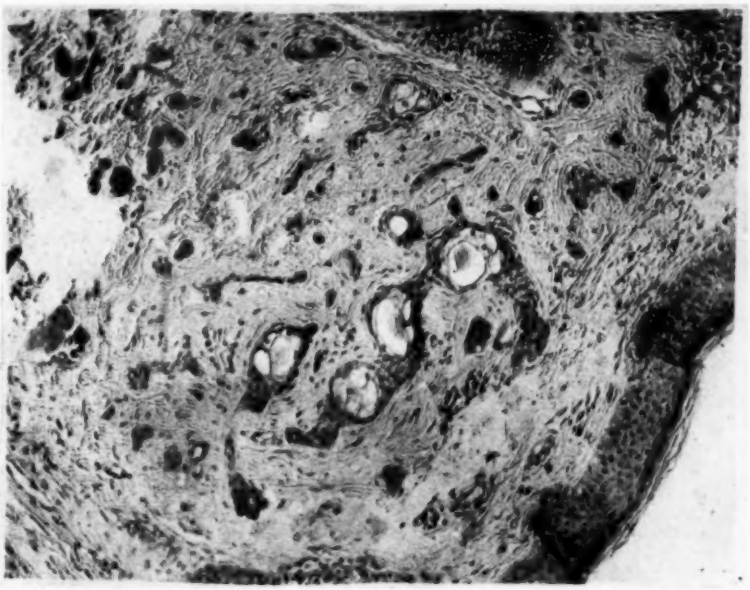


Fig. 5 (Greenbaum). Same as figure 4, showing multiloculated cavities.

syringocystoma, from syrinx = tube and cystoma = new growth consisting of cysts, clearly describes these cylindrical epithelial tracts with numerous tube-like canals coursing through them. They do not appear to have their origin in sweat-gland ducts, as is thought by some foreign observers who have termed them hydroadenomas.

Serial section study no. 2: The epidermis showed little or no change. In the dermis were numerous collections of epithelial cells in which were variously sized cyst-like cavities, some of which contained granular débris. At certain points these epithelial masses appeared to be connected with the epidermis. Some of the sections showed a mass of some of these cell collections. The morphological appearance was that of tricoepithelioma.

Syringocystomas are easily diagnosed clinically. They may be distinguished from milia by the fact that these latter are whitish firm cystic lesions which disappear on puncture and expression of their contents. From xanthelasma or xanthoma palpebrarum they are easily distinguished in marked and fairly marked instances of this latter condition. In mild cases there may be some difficulty, but the tendency of xanthomatous lesions to be located on the eyelid close to the inner canthus, their definitely yellow color, and the generally larger patch of eruption should serve as

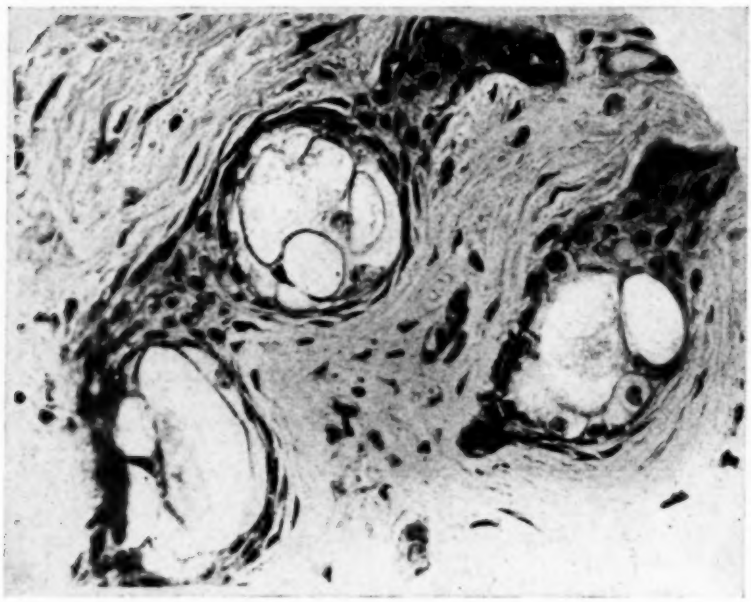


Fig. 6 (Greenbaum). High power of figure 5.

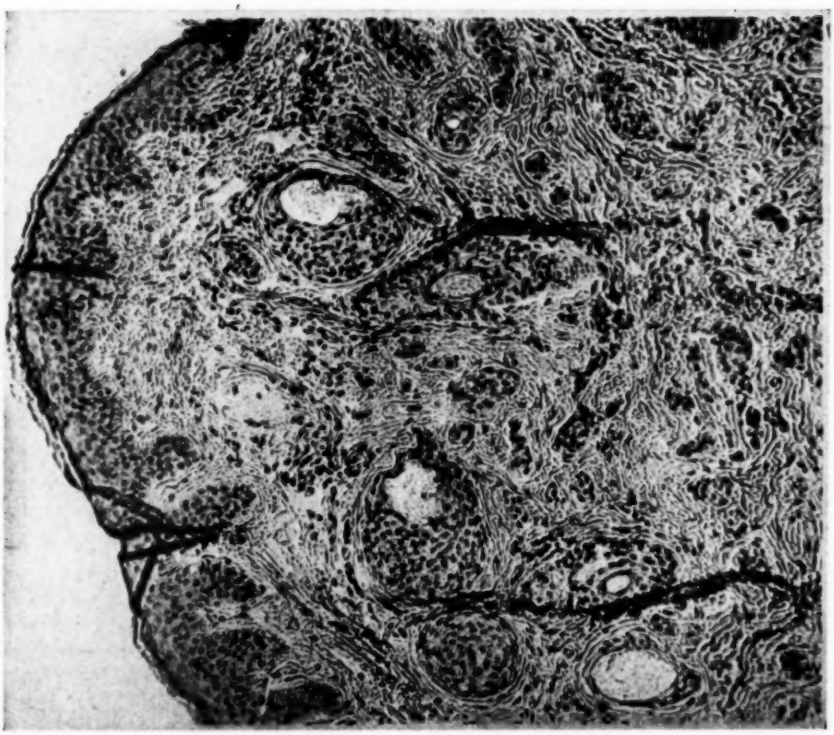


Fig. 7 (Greenbaum). Low power, from section study 2. Note masses of epithelial cells showing variously sized cyst-like cavities.

distinguishing features. The histological appearance is of course altogether different. In molluscum contagiosum the lesions are definitely elevated above the skin surface, have a distinct waxy appearance, and on close inspection one generally finds a minute rounded follicular orifice at their apex, through which may be expressed a cheesy material. Fibromata are usually single hard elevated newgrowths, as are verrucae, except that in this location the latter are apt to be filiform and, in the type known as flat juvenile warts, accompanied by many other lesions scattered over the face.

Tricoepithelioma or multiple benign cystic epithelioma, as generally described, consists of lesions which are firm and elevated to a variable degree above the surface, and which have a pearly appearance. The microscopic picture is likewise different. Reference has already been made to the possibility of a distinct relationship between these two conditions.

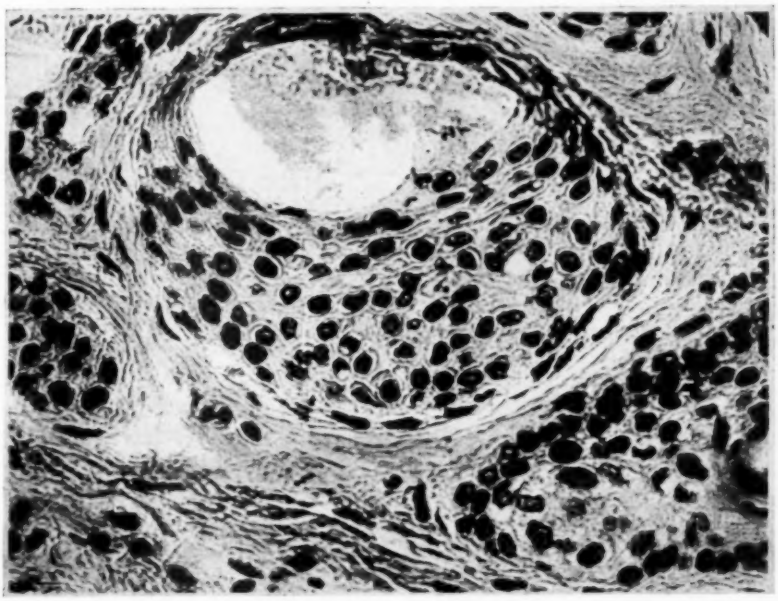


Fig. 8 (Greenbaum). High power of a single epithelial cell mass in figure 7.

The treatment of syringocystoma when demanded consists in destroying each lesion with a fine cautery point.

1714 Pine street

ATYPICAL CONJUNCTIVITIS TULARENSIS: WITH CASE REPORT

C. P. CLARK, M. D.
INDIANAPOLIS

A boy of seven years had a single punched-out ulcer of the bulbar conjunctiva and the episclera, with necrotic center. There had been no previous illness resembling tularemia, and no animal source of infection could be traced. The blood serum gave positive agglutination with Bacterium tularense at the end of the first week. The history of the subject is carefully reviewed. Read before the Indiana Academy of Ophthalmology and Otolaryngology, December 14, 1927.

Conjunctivitis tularensis is an uncommon condition. I wish to present the clinical history of a patient in whom there were unique variations from the usual picture. They were as follows: (1) A single ulcer was in the bulbar conjunctiva and the episclera instead of multiple ulcers in the palpebral conjunctiva. (2) The patient had had no previous illness that resembled tularemia in any of its forms. (3) No animal source of infection could be discovered. (4) The course of the disease was mild. (5) The blood serum gave a positive agglutination with Bacterium tularense at the end of the first week. (6) There was marked swelling of the regional lymph glands. (7) The lesion healed without damage to the eye.

Tularemia is an infectious disease found primarily in rodents. The susceptible zoological groups are the rodentia and mammalia, with transmission usually effected by a blood-sucking insect. The intermediate host is not limited to any one species of insects, as flies, wood ticks, rabbit lice, bed bugs, and fleas have been known to transmit the infection. Laboratory investigators of this disease are almost certain to acquire the infection regardless of the most careful precautions, but the disease is not spread from man to man directly. New England is the only district in this country where the disease has not been found in man or animal. It was not found outside of the United States until 1925, when Ohara of Japan isolated the organism from the tissues of a rabbit found dead of a plague-like epidemic, and a volunteer human subject inoculated from the tissues of the animal acquired tularemia.

As early as 1905 it was known that a disease resembling bubonic plague affected the California ground squirrel. The United States Public Health Service feared bubonic plague might be spread from that source. Efforts to examine an animal that had died of the suspected disease were not successful until 1911, when McCoy and Chapin investigated a fatal epidemic among animals. These workers determined that the disease was not bubonic plague, and isolated the causative organism, to which they gave the name Bacterium tularense, from Tulare county, where it was found. The organism is a small gram-negative, nonmotile, nonspore-bearing, aerobic bacillus which grows best on coagulated egg yolk or serum glucose cystin agar. It stains well with the aniline dyes and is readily killed by heat.

Prior to 1911 there had been no recognized instances of tularemia infection in human beings. During the investigations conducted by McCoy and Chapin, two laboratory workers became ill of an undiagnosed illness which was later recognized as and proven to be tularemia. The blood serum was found to agglutinate Bacterium tularense.

In human beings the first cases of ocular infection recognized as tularemia were reported by Vail (1914) and Sattler (1915), both of Cincinnati. Vail named the disease squirrel plague conjunctivitis. These cases illustrated the oculoglandular type of the disease. The essential features were: (1) that the handling of wild rabbits constituted the source of infection; (2) multiple ulcers in the palpebral conjunctiva, varying from the size of a pin head to six millimeters in diameter; (3) swelling of the regional lymph glands; (4) fever of an intermittent type; (5) a prolonged convalescence; and (6) blood serum agglutination with Bacterium tularense.

In Millard County, Utah, insect bites were known to be unusually serious, and the victims of the horse-fly, Chrysops discalis, were afflicted with an intermittent fever called "deerfly fever". R. A. Pearse, in Northwest Medicine for March, 1911, referred to six cases seen by him between August, 1908, and August, 1910. In each instance the bite occurred upon the exposed surface of the body by the horse fly, Chrysops discalis. According to his description: "In all the cases there has been marked swelling of the glands and lymphatics about the area of the bite. In about one-half of the cases some of the glands have gone on to suppuration. Most of the patients have had severe chills, sometimes during the incubation period, others have had chilly sensations. The temperatures have run from 98 to 104 degrees. The duration of the disease has been from one to four weeks, the severity varying from slight malaise to cases in which death ensued. All of the bites have gone on from a red infiltration like a mosquito bite to complete breaking down of the tissue and sloughing, forming a punched-out circular ulcer one-fourth inch (six mm.) in diameter and one-eighth inch (three mm.) in depth." In 1919 the infection in Utah was investigated by Dr. Edward Francis of the United States Public Health Service, who determined that the disease was tularemia. It was also found that the rabbits were dying in large numbers when the fly Chrysops discalis transmitted the infection. The organism was being carried from rodents to man by the intermediate host, Chrysops discalis.

In 1923 a nonfatal type of "tick fever" was described from Idaho. This was investigated by Francis, who demonstrated that this malady also was tularemia, and was transmitted by the wood tick, Dermacentor andersoni, which is the same tick that transmits Rocky Mountain spotted fever. It had been observed that the supposed Rocky Mountain spotted fever varied markedly in severity, depending upon the region whence the infection came. On one side of a natural barrier, such as a river, a high mortality occurred, while across the river the mortality was very low. What actually happened was that two similar diseases were transmitted from the same source, one tularemia and the other Rocky Mountain spotted fever. The wood tick transmits the organism through its eggs to succeeding generations, which creates a reservoir of infection impossible to eradicate.

The rodents found infected in nature are California ground squirrels, wild rats, and wild rabbits. Francis states that domestic rabbits raised in rabbitries have never been known to be naturally infected. Rudesill reported (unpublished) before the Marion County Medical Society, November, 1926, the history of a child who was infected from a pet Belgian hare. The eyes were not involved.

According to Francis, who has described tularemia infection in man in a classical monograph, there are four clinical types: (1) typhoidal, (2) glandular, (3) ulceroglandular, and (4) oculoglandular. The last type is the one in which we are particularly interested, and descriptions of the first three are omitted.

The oculoglandular type of infection begins in the conjunctival sac or in the lids, and there is a characteristic punched-out ulcer. There are pain, edema, epiphora, and intense swelling of the lymph glands in the submaxillary or parotid areas. In the few previously reported ocular cases of tularemia there were multiple ulcers in the palpebral conjunctiva. D. T. Vail, Jr., reported the history of a patient in whom there was one ulcer in the bulbar conjunctiva and many small ones in the palpebral conjunctiva. There are constitutional symptoms as in the other clinical types, expressed in a moderately high leucocytosis with chills and paroxysms of fever. A vesicular skin eruption is frequently observed..

Serum agglutination with Bacterium tularense is the most accurate laboratory test. There is cross agglutination in low dilutions with Bacillus abortus and Bacterium melitensis. In tularemia the blood serum should give a positive agglutination during the second week of the disease, and increase in strength until the twelfth week. The serum agglutinating power remains for as long

as two years, and probably is present during the entire life of the patient. Complement fixation has been demonstrated, but the agglutination test is the more reliable, and requires less laboratory work.

The conjunctival lesion consists of an ulcer with a necrotic center at the point of bacillary invasion. The spleen, liver, and lymph glands are swollen and hemorrhagic, and when sectioned show necrotic areas resembling recent tubercles. Cultures direct from these tissues will yield the organism. The bacillus can be obtained from human sources by inoculating laboratory animals with material taken from the ulcer, and then using the animal tissues for planting into media.

Conjunctivitis tularensis (Clark)

The disease is to be differentiated from bubonic plague, Rocky Mountain spotted fever, tuberculosis, typhoid fever, B. abortus infection, Bacterium melitensis infection, and glanders. The oculoglandular type of tularemia is to be differentiated from Parinaud's conjunctivitis, sporotrichosis, blastomycosis, leptothrix infection (Verhoeff), and conjunctivitis infectiosa necroticans (Pascheff).

The details of the writer's case are as follows: R. H., male aged 7 years, was sent home from school by the teacher December 1, 1926, because of a red and watery left eye. The parents did not consult a physician until December 4, 1926, when they became alarmed at the swollen condition of the left eyelids and the appearance of a mass in front of the left ear. The family physician referred the patient to me and I saw him about 4:30 p.m. There was no history of chills or fever, but the patient had eaten very little food during the previous two days, and had vomited once. The pulse was 120, the temperature 102.4°F.

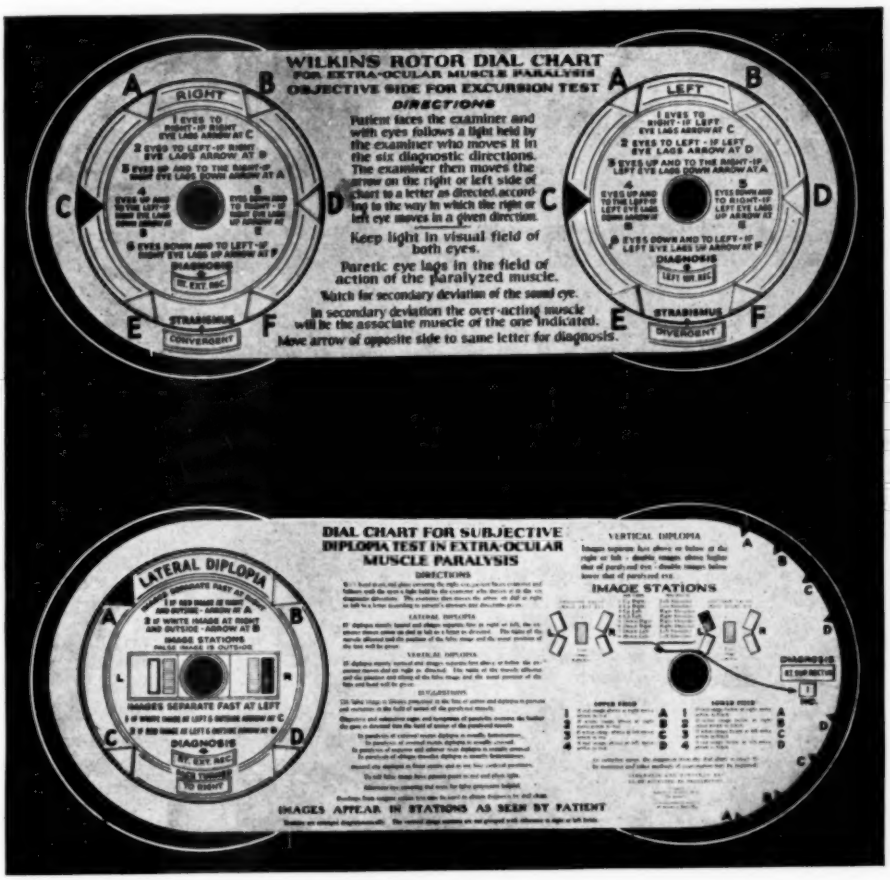
The right eye was healthy. The left eye presented moderate swelling of the lids, and chemosis of the temporal bulbar conjunctiva of such degree that the membrane protruded between the lids. There was no exudate on the lid margins or on the conjunctiva. The temporal half of the cornea was covered by the swollen membrane. Upon separating the lids and drawing the conjunctiva from the eyeball, an oval punched out ulcer was found four mm. from the limbus at three o'clock. The ulcer was three mm. deep, and four to five mm. in diameter, with elevated and indurated margins, and it had a gray necrotic center. The palpebral conjunctiva of each lid was swollen in the temporal half. The nasal half of the conjunctiva was unaffected, and the cornea was not involved. The iris, pupil, and anterior chamber presented no pathology. Through a dilated pupil no fundus pathology was found.

There was a large hard swelling over the ramus of the mandible, extending out as far as the auricle. The mass was firm, moderately tender to touch, and the skin, which was not discolored, was freely movable over it. No evidence of the mass was to be found in the mouth. Stenson's duct functioned properly. The tonsils were enlarged and cryptic. No masses were palpable in the submaxillary region.

Cultures were made from the center of the ulcer on blood and testicular agar, since proper media could not be obtained at that hour. No growth resulted. Smears were made and stained by the Gram-Weigert method. No organism was found.

The parents and child were questioned about contact with animals. The boy had no pets and the family had had no rabbits for food. There was no knowledge by anyone of an insect bite. No animal source of infection could be found.

This illustration should have accompanied the paper by Dr. SAMUEL H. WILKINS in the March issue. Use gummed edge to fasten in place at page 207.


WILKINS ROTOR DIAL CHART
FOR EXTRA-OCULAR MUSCLE PARALYSIS
OBJECTIVE SIDE FOR EXCURSION TEST
DIRECTIONS
Patient faces the examiner and with eyes follows a light held by the examiner who moves it in the six diagnostic directions. The examiner then moves the arrow on the right or left side of chart to a letter as directed, according to the way in which the right or left eye moves in a given direction.
Keep light in visual field of both eyes.
Paretic eye lags in the field of action of the paralyzed muscle.
Watch for secondary deviation of the sound eye.
In secondary deviation the over-acting muscle will be the associate muscle of the one indicated.
Move arrow of opposite side to same letter for diagnosis.
RIGHT
LEFT
STRABISMUS
CONVERGENT
DIVERGENT
DIAGNOSIS
LATERAL DIPLOPIA
DIAL CHART FOR SUBJECTIVE DIPLOPIA TEST IN EXTRA-OCULAR MUSCLE PARALYSIS
DIRECTIONS
IMAGE STATIONS
IMAGES SEPARATE FAST AT LEFT
IMAGES APPEAR IN STATIONS AS SEEN BY PATIENT

Wilkins' rotor-dial chart for extraocular muscle diagnosis.

UNIV. OF MICH.

Two percent mercurochrome-220 ointment was prescribed to be applied directly to the ulcer. Also, cold applications were to be applied to the lids, and heat to the swollen lymph glands. A saline cathartic was ordered and the patient was confined to bed. After forty-eight hours the ulcer had a marked mercurochrome stain, and there was less conjunctival chemosis. The preauricular glands had not diminished in size. At four p.m. the pulse was 96, and the temperature 99.2°F. The general condition of the patient was improved. Blood was obtained for the serum agglutination test with Bacterium tularense.

On December 8, 1926, the conjunctival ulcer was reduced in extent. The gray necrotic center had disappeared, leaving a smooth clean base on the sclera. The conjunctiva did not protrude and the eyelids could be closed. There was less preauricular swelling. The pulse was 86, the temperature 98.6°F. The blood serum agglutinated Bacterium tularense strongly in 1 to 160 and partially in 1 to 320; while the controls showed no agglutination.

The patient was seen at varying intervals until December 24, 1926, when there was no palpable preauricular swelling and the ulcer on the eyeball was healed. On December 30, 1926, a report from the family stated that there had been no recurrence of symptoms.

In the diagnosis of this case, Parinaud's conjunctivitis, sporotrichosis, blastomycosis, leptothrix infection (Verhoeff), conjunctivitis infectiosa necroticans (Pascheff), and tularemia conjunctivitis were to be considered, Parinaud's conjunctivitis and leptothrix infection could be excluded because of the acute but brief course, and the absence of giant lymph follicles, of exuberant granulation tissue, and of multiple ulcers in the conjunctiva. Blastomycosis and sporotrichosis could be excluded by the absence of vegetations on the eyeball or eyelids, and of ulcers in the surrounding tissue. Moreover, there was prompt healing without the use of iodides or excision of the infected tissue.

Weaver and Gillet have called attention to an eosinophilia of the blood stream in patients suffering from Parinaud's conjunctivitis. This was not employed as a differential diagnostic aid in the case reported as it did not come to my attention until the appearance of the second article on that subject by S. R. Gifford (American Journal of Ophthalmology, July, 1927).

Conjunctivitis infectiosa necroticans is thought to be the same disease as tularemia. This opinion was quoted by Vail from W. B. Wherry (Section on Ophthalmology, American Medical Association, 1924, page 61). Pascheff (American Journal of Ophthalmology, October, 1927) disagrees with this opinion, and shows that conjunctivitis tularensis and conjunctivitis infectiosa are similar but are separate diseases. He quotes from Francis, who states that the causative organisms are different and that the diseases can be differentiated serologically. The organisms of conjunctivitis infectiosa necroticans will grow on common media, but Bacterium tularense requires special media. Conjunctivitis infectiosa necroticans has many ulcers of varying sizes in different stages of development in the palpebral conjunctiva, while conjunctivitis tularensis does not have successive crops of ulcers.

Tularemia infection is usually accompanied by a severe systemic reaction, but in some of the early cases reported from Utah and Idaho there were patients who had mild reactions.

In the case here reported, the serum agglutination of Bacterium tularense, the conjunctival ulcer, and the marked enlargement of the regional lymph glands, with fever, are to me conclusive that the disease was one of atypical conjunctivitis tularensis. The outstanding exceptional feature was the single ulcer in the ocular conjunctiva.

503 Medical Arts building.

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AN INSTRUMENT FOR MUSCLE TUCKING

C. E. G. SHANNON, M.D., AND WILLIAM J. HARRISON, M.D.
PHILADELPHIA

The instrument, similar to those devised for a like purpose by Bishop and Burch, combines an adjustable hook for raising and two forceps blades for grasping the tuck, a double suture being passed through a notch at the end of the closed blades. Read before the College of Physicians of Philadelphia, Section of Ophthalmology, January 19, 1928.

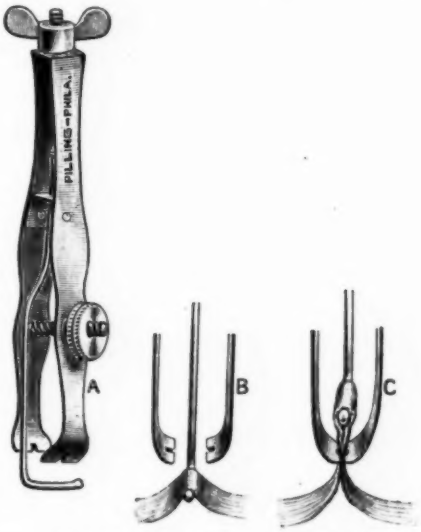
At the meeting of the Section of Ophthalmology of the College of Physicians and Surgeons of Philadelphia in April, 1926, Dr. Frank C. Parker read a paper entitled "The Todd muscle-tuck, with a modification".

The results reported by Dr. Parker excited the interest of the writers. For many years we had been employing, with hardly any variation, the Worth operation and felt it perhaps satisfactory and adequate. In a certain number of cases operated upon by this method the results were highly successful, but in other cases a certain amount of squint remained that was discouraging. Therefore with the hope of increasing our percentage of successful cases, strengthened by the attractive results generally obtained by Dr. Parker, we determined to try out thoroughly the tucking method of operation in strabismus. We employed at first the Todd tucker, which had been recommended by Dr. Parker. This in our inexperienced hands proved somewhat awkward. To overcome our awkwardness, one of us (Dr. Harrison) devised an instrument that enabled us to secure the loop with little difficulty and has to our minds greatly simplified the entire operative procedure. The instrument is similar to one devised by Bishop, and another, later, by Burch. It consists of two principal parts, namely:

First, the equivalent of a spring forceps, the blades of which may be approximated by means of the nut and threaded bar.

Second, a hook, situated between the forceps blades and which may be raised or lowered in relation thereto, by means of a wing nut shown at the upper extremity.

The instrument being applied perpendicularly to the muscle, with the cross-bars forming its base squarely at right angles to the edges of the muscle, the hook is lowered sufficiently to be passed under the muscle, then, by means of the wing nut above, the hook is raised, drawing the muscle up between the blades of the forceps. When sufficient length of muscle has been drawn up, the forceps is closed by means of the round nut at the side of the instrument, and the muscle loop is securely held while a double suture,



Eye Tendon Tucker (Harrison)

guided by the notch at the extremities of the blades, is passed through the center of the muscle.

Detailed technique of operation: The conjunctiva is grasped by forceps about six mm. from the limbus over the muscle to be operated upon. By means of blunt pointed scissors a vertical incision about eight mm. long is made, and by dissection the conjunctival and subconjunctival tissues are cleared from the muscle. The strabismus hook is then passed under the muscle in the usual manner. A second hook is simi-

larly applied and the two are then separated about fifteen mm. so as to bring the muscle forward and somewhat on the stretch.

The under surface of the muscle is curetted by means of a right angle curette. This curettement favors adhesion of the opposing surfaces of the looped muscle. The instrument is then held in the perpendicular position and the hook of the instrument is placed under the muscle. Following this procedure the strabismus hooks are removed. Then, as described above, the hook of the instrument is drawn up to create the tuck, the blades are closed and a double plain catgut suture is passed through the muscle at the notch in the blades.

This notch is important, as it avoids injury to the sclera, and facilitates the passage of the needle. The catgut is severed at the needle end, and the two halves of the tuck are tied off. There is no difficulty in placing the knot of each half of the tuck directly under the blade. The instrument is then removed from the tucked muscle by simply lowering the center hook and releasing the closed blades by means of the side nuts. The conjunctival wound is closed by two sutures, anchoring the tuck between. Both eyes are bandaged.

In case of convergent squint, atropine is instilled daily in each eye at the time of dressing. In divergent squint, no atropine is used.

In convergent squint, the eyes are uncovered about the fourth day, the conjunctival sutures being removed in about eight days.

In divergent squint, the eyes are uncovered in two days and the conjunctival sutures removed in eight days.

There is little reaction and the lumping is not permanent. We are able to correct between thirty and thirty-five degrees of squint by operating on one eye. For high degrees, double tucking will be necessary.

Advantages of the instrument: First, simplicity of instrument, with resultant simplicity of operation.

Second, easily sterilizable.

Third, amount of muscle tucked easily seen.

Fourth, notch in instrument prevents injury to sclera and permits easy introduction of the suture.

Fifth, closure of the blades on the muscle tuck avoids traction when tying suture, giving a secure, tight knot.

Sixth, there is no interference by assistants' hands as the instrument can be held by the distal extremity and the operator has free access to the muscle.

Advantages of the operation: First of all, it is safe. In the Worth operation sutures are taken in the episcleral tissues and occasionally the globe is punctured. An accident of this type is rare, but always possible.

Second, it is a comparatively simple procedure. No sutures are taken except to tie off the loop and close the wound. In the Worth and Reese operations three sutures are employed. This necessitates greater detail in execution of the operation, and later these sutures must be removed, sometimes with considerable difficulty.

Third, the sutures never slip or tear as occasionally noted in the Worth operation. As Dr. Parker has well stated, the operation allows one to retire for a good night's rest.

We may be oversanguine, but the results in our series of cases, during the last year, have led us to approach a squint operation with a great deal of assurance.

The instrument, of stainless steel, was made for us by George P. Pilling and Son Company of Philadelphia.

3452 Kensington avenue.

LOSS OF VITREOUS

ISAAC HARTSHORNE, M.D., F.A.C.S.
NEW YORK CITY

Three cases of extreme loss of vitreous during cataract extraction are reported, with a discussion of the immediate and subsequent care of such cases. In two of the three cases the visual results were surprisingly good. It is suggested that the prognosis after vitreous loss is better with the intracapsular than with the capsulotomy operation. Read before the Eye Section of the New York Academy of Medicine, October 17, 1927.

The method of teaching usually used by the late Maurice Richardson of Boston always impressed his students with its practical advantages. He spent most of his time in the lecture room telling us about his mistakes and seldom if ever mentioned his successes.

In this same vein of thought, I wish to record three cases of extreme loss of vitreous, with the hope that a statement of the errors helping to cause this unfortunate accident, together with a description of the after care which doubtless contributed largely to the unusually happy results in two of the three cases, may help someone else under similar circumstances. I do not in any way wish to appear to condone vitreous loss, nor to lessen any younger surgeon's healthy respect for the vitreous.

These were all private patients, aged 64, 70, and 63 years respectively; the first male; the second and third females.

Two of these cases are taken from the series of my modification of the Barraquer-Green intracapsular operation, and will be detailed again in a future report of this type of operation. The third was an attempted capsulotomy.

The first two were so similar that they can be discussed as one case. Deep intraorbital anesthesia, after the method of the Greens, and infiltration of both the upper and lower lids were used so that the patient could not voluntarily close the eyelids and could not rotate the eyeball to any extent. This precluded the possibility of squeezing. The fact that I am not satisfied with this type of anesthesia and have given it up temporarily will be discussed at some future time.

In each case the vacuum cup was applied and took hold of the lens perfectly, and there was no presentation of vitreous before the lens was extracted in capsule. In each case, immediately after the withdrawal of the lens the wound gaped widely and at least a third of the vitreous rolled out before the eye could be closed. The upper lid was then gently lifted away from the globe with a muscle hook; and, with a flat spatula, as much of the escaped vitreous as possible was wiped away from the wound and the corneal edge of the wound placed in contact with the scleral edge. One percent noviform ointment was put in the eye and the eyes closed and covered in the usual way.

Both of these cases were among the earlier ones in my efforts with the vacuum operation. In trying to combine pressure below the cornea with traction from above, the prolonged pressure caused the wound to gape instead of closing, after the removal of the lens. This explanation was suggested to me by Doctor Alfred Wiener, who was present at each operation; and I believe it is correct. This led me to discard the special instrument used by the Greens for this purpose and to use instead the combined Fisher needle and Smith spoon. With the needle the cornea is lifted so that the vacuum cup can be inserted under it. Turning the instrument end to end in the left hand, the edge of the spoon is then used to produce gentle and almost imperceptible pressure below the cornea while the traction from above withdraws the lens. The upward motion of the right hand holding the vacuum forceps is followed by the left, so that the flat of the spoon holds the cornea in place and the wound does not gape. Since adopting this procedure I have had no loss of vitreous at this stage of the operation.

After finishing the first of these operations, Doctor Wiener remarked that I

should have to take that eye out in a few days. Six months later I asked him to examine this eye and he said: "All I can say is that it is not the same eye."

In the third case there was a hard lens with adherent capsule which did not look fully mature. This patient was from beginning to end the worst squeezer I ever had. When I get another like this I shall certainly use a general anesthetic. Up to the time for operation, I had expected to do a vacuum intracapsular, but her bad squeezing made me decide to do a capsulotomy. Both upper and lower lids were infiltrated with two percent novocain, which reduced the squeezing to a minimum, but she still seemed able to push the eyeball forward without closing the lids.

The cystotome apparently made no impression on the lens capsule. When I attempted to express the lens by pressure from below as if I were doing a Smith extraction, the zonule broke at the top of the lens, allowing vitreous to present, but in another second the lens came upward without tumbling and filled the wound, so no vitreous was lost at that stage. Here, again, after the lens was extracted the wound gaped widely, and at least one half of the vitreous rolled out. Even after closing the eye, the whole vitreous body seemed to fill the wound and kept the cornea from going back into place. After some coaxing with a flat spatula and holding the upper lid with a muscle hook, I succeeded in tucking the corneal edge of the wound up under the scleral edge as that was the nearest to coaptation I could get. As I expected a collapsed eyeball, this at least could do no harm. Routine dressing was applied to both eyes as if nothing had happened.

In the first two cases I did not use a flap. In this case I had dissected a Van Lint flap but could not pull it into place because of the partially collapsed eyeball. This would have been a good case for Berens' untied suture flap, but this type of flap in my hands has interfered with my section, tending tomake me cut too deeply, so I do not use it.

Criticisms or suggested improvements in the third case are several:

(1) A general anesthetic might well have been used. And yet if this precaution had been taken, the patient squeezed enough at each dressing to ruin any eye.

(2) Too much pressure below the cornea in the effort to rupture the zonule will cause excessive gaping of the wound.

(3) This might have been a good case for the Knapp-Török operation.

(4) When the zonule breaks above so that vitreous presents, it is safer to use a wire loop or Hess spoon inserted behind the lens and lift the lens out without further pressure from below.

The correctness of this last suggestion became evident one week later when our house surgeon was doing a cataract operation for me. This patient did not squeeze but the cystotome did not rupture the anterior capsule, and pressure below the cornea caused vitreous to present at the wound. I at once relieved the doctor of the operation, as it was evident that a storm was ahead; and, with a wire loop inserted behind the lens, easily extracted it in capsule with no loss of vitreous. This is a procedure we have all used many times and it is dramatically helpful or tragically omitted.

After treatment: If cases one and two had been dressed in 24 hours or 48 hours as is customary, I firmly believe a good result would not have followed. The patients were kept as quiet as possible and the eyes not dressed for five days. The Greens do not dress their vacuum cases for ten days, which I have found impracticable. Both eyes were kept covered with dressing and mask for ten days. No medication was used except one percent noviform ointment and an occasional drop of one percent atropin and twenty-five percent argyrol.

When the eyes were allowed to really open, the wound in each eye was not fully closed though firmly healed. There was no prolapse of iris. The scar tissue was increased and the wound closed tightly with daily applications of one percent silver nitrate, and dressing applied to keep the eye closed for several days.

Case one was discharged from the

hospital in sixteen days; case two in twenty-three days. Both cases had a hammock but not drawn-up pupil.

In case three I expected a collapsed eyeball and so removed the dressing in twenty-four hours—to find the lower part of the eyeball normally rounded and full. The cornea and wound were not inspected; the dressing was reapplied and the eye left alone for four days more. In this case the wound was ragged and irregular, but finally closed with silver nitrate and pressure bandages. On the twelfth day and for several days this patient could count fingers, but a few days later she could only distinguish light, and I found practically complete detachment of choroid and retina but with a well rounded eyeball. Doctor Norton Fletcher and later Doctor Colman W. Cutler saw this patient with me in consultation, and both felt that there was no need of removing the eyeball at that time.

Results in cases 1 and 2:

Case 1: Combined iridectomy and vacuum intracapsular extraction on June 10, 1925. At all times the fundus has been seen easily and the vitreous has been perfectly clear, without opacities. First glass, July 31, 1925: R.+9.50 sph.+5.50 cy. ax. 35°=20/40+2;+3 sph. added for near gave vision=1.5 m. This vision gradually improved to July 26, 1926. R.+9.50 sph.+4.25 cy. ax. 25°=20/15−3;+3 sph. added for near gave vision=0.75 m.

I did preliminary iridectomy on the other eye on May 18, 1926, and a capsulotomy extraction on June 15, 1926. No vitreous was lost, and the best vision obtained was 20/15 with +9.50 sph. +3.75 cy. ax. 10°: +3 sph. added for near gave vision=0.75 m.

This patient has a progressing tabes dorsalis and is developing optic atrophy with decreasing vision. It is now 20/25+ with each eye. Each vitreous is perfectly clear and there are no abnormal fundus changes other than gradually increasing pallor of the discs.

Case 2: Following preliminary iridectomy, I did a vacuum intracapsular extraction on January 26, 1926. The vitreous has shown no opacities and the fundus has remained negative. There has developed marked sclerosing keratitis downward about three mm. from the corneoscleral wound. An unusual, apparently noninflammatory grayish-white membrane has gradually developed from above downward over the surface of the vitreous, behind the iris and not attached to it. Fortunately this membrane stopped about one mm. above the lower pupillary border and so has not obstructed vision. In fact it has aided vision because it makes a pin hole opening at the lower margin of the pupil.

First glass: March 4, 1926, R.+9.50 sph. +4. cy. ax. 45°=20/40+3 sph. added for near gave vision=0.75 m. This vision gradually improved with several changes of glasses She is now wearing: R.+12.00 sph. +1.00 cy. ax. 90° and +3 sph. added for near.

When last tested, February 3, 1927, distance vision=20/15+3, and near vision=0.50 m. type. In the spring of 1927 she was in an automobile accident without injury to the eye. In June, 1927, she fell down a flight of stairs head first. I saw this patient at home September 23, 1927, and the eye was in perfect condition without vitreous or fundus changes. Her vision appeared to be excellent, including reading of fine print.

Cases one and two show that marked loss of vitreous does not necessarily mean a lost eye, especially if good coaptation between the cornea and sclera are obtained before the final dressing; and provided the eye is left alone long enough to give a chance for firm closure of the wound and for the eyeball to fill with aqueous.

Cases one and two suggest the following considerations:

In the presence of marked loss of vitreous, the eye has a greater chance of preservation if the lens has been extracted in capsule than if the posterior capsule was left behind; because, since vitreous is not replaced, the eyeball must be refilled by some fluid to be preserved and that fluid is naturally the aqueous. If the posterior capsule is intact, its upper edge will quickly heal in the scar and prevent the aqueous from filling the vitreous cavity, and hence allow the eyeball to collapse

because of lack of sufficient contents to hold its shape; whereas, if the entire capsule has been removed with the lens, the hyaloid having been ruptured, the aqueous has more opportunity to enter the vitreous cavity and so fill the eyeball to its normal capacity. This is what I believe happened in these two cases.

30 West Fifty-ninth street.

CLOSURE OF THE DRAINAGE ANGLE

MICHAEL GOLDENBURG, M.D.,
CHICAGO

Closure of the drainage angle in glaucoma is attributed to mass movement of the ciliary body processes, and iris, secondary to abnormal dilatation of the capillaries which form the major portion of these structures, this abnormal dilatation being in turn attributed to a reaction caused by toxic or irritant substances from the blood stream. Read before the Chicago Ophthalmological Society, December 19, 1927. (See page 303 for report of discussion.)

In a previous paper read before the Chicago Ophthalmological Society* I presented a theory on the mechanism of normal intraocular pressure based to a large extent on the newer knowledge of the anatomy and physiology of capillaries. Much importance was attributed to the part played in this mechanism by the extrinsic and intrinsic muscles of the eyeball and their motor nerve supply.

The theory to be presented on the closure of the drainage angle is based on the same phenomena in an abnormal state. I am aware that some observers consider the aqueous humor to be a more or less stagnant fluid and in physicochemical equilibrium with the blood plasma of the capillaries. With the first statement I cannot fully agree, but there would seem to be little reason to question the latter.

I am thoroughly convinced that the source of the aqueous is in the blood stream and, to a greater extent, in the capillaries that go to form the ciliary processes. It is quite probable that other sources are available wherever capillaries exist. In the ciliary processes we have a unique circulation, entirely out of proportion to its purely nutritional demands, that lends itself favorably to the elaboration of such a fluid. The facts that every element present in the aqueous is also to be found in the blood and that likewise every element of the blood can be demonstrated in the aqueous would seem very conclusive evidence as to its source.

The biologic chemistry involved in its formation is very complex, but probably not more so than the elaboration of other refined body fluids, which cannot be discussed in detail at this time. Those interested in this problem I would refer to the very comprehensive monograph by Duke-Elder in the British Journal of Ophthalmology (1927) on the nature of intraocular fluids.

It is sufficient to state that the capillary wall must be viewed as a semipermeable membrane, permeable to crystalloids in solution and impermeable to colloids. Duke-Elder has well summarized this mechanism in the following paragraph:

"As with their formation, so with their metabolism and circulation, the intraocular fluids and the tissue fluids of the body are regulated by the same factors. There is a continuous process of reciprocal interchange on either side of the capillary walls, made up of filtration outwards, determined by the difference in the hydrostatic pressures, an osmotic flow in the opposite direction, conditioned by the relative osmotic pressures, a diffusion out or in of the diffusible substances according to their several differences in concentration, and a readjustment depending on colloid impermeabilities. On to this is superimposed a 'circulation in mass' conditioned by muscular activity."

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* Illinois State Medical Journal, December, 1927.

Krogh and others have demonstrated that capillaries have, external to the stereotyped endothelial tube, a modified muscle layer consisting of oblong cells (Rouget cells) with many fine prolongations which surround this tube

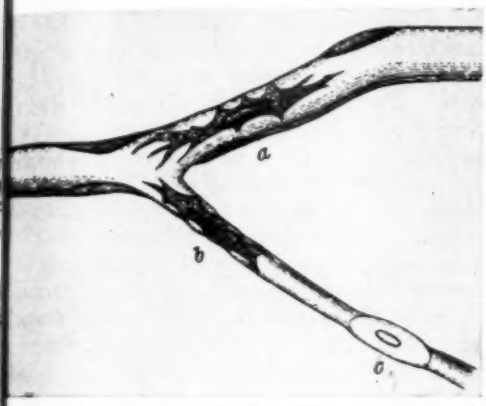

Fig. 1 (Goldenburg). Two Rouget cells (*a* and *b*) as seen on capillaries in living newt larvae. *b* is contracting, *c* is a red corpuscle. (Vimtrup.)

and which are subject to contraction and dilatation under various stimuli. Krogh has demonstrated experimentally "that the capillaries are not merely passively distended by arterial blood pressure, but possess a tonus of their own and may show contractions and relaxations independently of the corresponding reactions in the arteries; that the muscular coat of capillaries possesses, like smooth muscle generally, a definite tonus or posture, subject in the organism to nervous, hormonal, and other influences."

Petersen and Willis (1926) make the following statement: "We have heretofore been accustomed to think of the capillary system and its functional control in terms of the vasomotor mechanism, and have come to confuse the reaction of the musculature of the arteriole with the presumptive reaction of the capillary wall. Indeed, an independent dilatation and contraction of the capillary has until recently been regarded as improbable, or merely of academic interest."

Krogh states that normally the capillaries are not all dilated or contracted at one and the same time, but a goodly proportion may be dilated while a like number are contracted. He has shown that capillaries may be so contracted as to inhibit the passage of even a single blood cell, or may dilate sufficiently to permit many cells to pass a given point at one time. (This is easily demonstrated in the human skin.) He has further demonstrated that in a resting muscle not all the capillaries are open; that is to-say, some of them

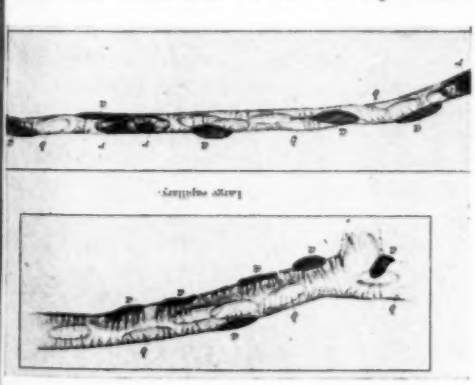

Fig. 2 (Goldenburg). Above, a large capillary with typical branched cells. *a*, the nuclei with thread-like processes which run around the capillary. *b*, nuclei of endothelial cells.

Below, a small and slightly contracted capillary of 8μ diameter. *a*, muscle cells. *b*, nuclei of endothelial cells. *r*, red corpuscles. From nictitating membrane of frog. (From Krogh.)

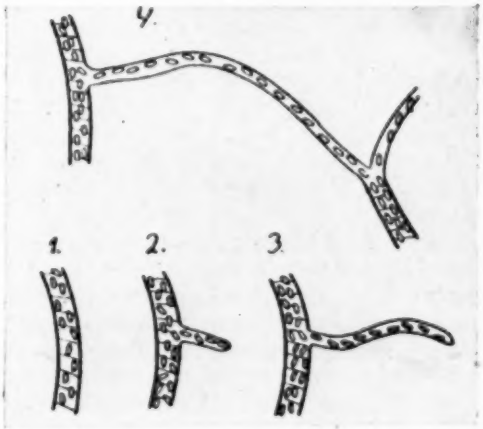

Fig. 3 (Goldenburg). Sketches of a capillary under stimulation. 1. A venule if slightly scratched with a fine glass needle shows a reaction, as in 2. A small branch opens and is filled with blood, which becomes stagnant. By further stimulus in front of the column of blood, further dilatation takes place, as in 3. The blood flows slowly on until the connection is established with an arteriole, resulting in a sudden onset of current in the opposite direction. (From Krogh.)

are contracted so that a much smaller surface area is available for diffusion, whereas in the active muscle the opposite is true.

As to the diffusibility of different substances, such as crystalloids and colloids, space will not permit of extensive citations, but in general one can say that in the capillary blood vessels we have a membrane which is permeable to crystalloids and impermeable to colloids.

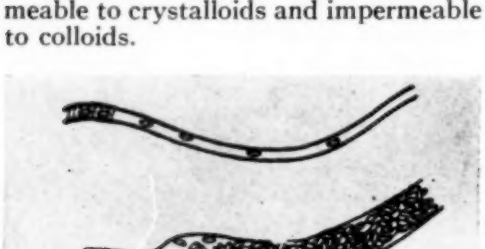

Fig. 4 (Goldenburg). Diagram of the effect of urethane on capillary in frog's tongue. The capillary before the application of urethane and after. (From Krogh.)

Krogh makes the following general statement: "No dilatation of capillaries involving mechanical stretching of the endothelium can take place without being accompanied by an increase in the permeability, an increase which runs, on the whole, parallel to the degree of dilatation, and which may allow all the normal plasma colloids to filter off rapidly when the capillaries are strongly dilated. Artificial solutions can produce an extreme dilatation of the capillaries".

Although most of this early work had been demonstrated on the lower animals much has since been verified in the human being.

We know that diffusible nonionized substances, e.g., sugar and urea in solution, pass through and are found in the aqueous in relative proportion to their presence in the blood. The ionized elements are controlled by electrical forces governing hydrogen ion concentrations. The colloid elements are found only in traces as proteins.

The rate of aqueous production has been differently estimated and reported as varying from about two to ten c.mm. per minute. It is not difficult to question these reports if one examines carefully the experiments and the technique used and the basis upon which such deductions were made. For example, the decompression experiment, where the aqueous in the anterior chamber is permitted to drain off and calculation made as to the time consumed in refilling and quantity content is distinctly faulty. By this technique an abnormal state is produced and one can only record the result obtained as such, which is not comparable with the normal.

The injection experiments are likewise defective in that they also record only the time necessary for a foreign substance, which must act as an irritant, to travel a given distance in a given time.

It is reasonable to assume that aqueous formation is in keeping with requirements, which requirements are dependent upon the conditions under which the eyes are functioning. By this is meant that during waking hours when physical work is performed by the ciliary muscle, iris, and probably lens during sleep the opposite is true, that aqueous production or change is not necessary to the same degree. We know that in an actively functioning muscle in other parts of the body many more capillaries are dilated for metabolic purposes than in a resting muscle and the same law must hold true for the eye.

I am inclined to think that a mass movement of fluid exists, but that its rate has been grossly overestimated and that much of the change is chemical. Furthermore, I am sure that the importance attached to the mass movement of this fluid per se in relation to the problem involved is much overrated.

The theory based on an excessive production of aqueous as the cause of tension can only hold true if we retain the theory of the secretory source of aqueous, and that theory has been virtually abandoned. If we accept the blood as the source of aqueous, and if an excessive production were possible, this excess would not be what we consider as normal aqueous but a fluid containing elements of the blood that are not in normal relation to each other. This fluid would be rich in plasma pro-

teins, whereas in the normal aqueous only traces are found, but it would be comparable to the so-called aqueous of secondary formation seen following decompression of the anterior chamber.

We do know that capillary permeability differs under various conditions, that substances of known or unknown toxic origin can enter the blood stream, act as irritants and stimulate the capillary endothelial cells, produce dilatation and increase permeability, and thus permit more elements of the plasma to pass into the aqueous chambers. An excessive production of fluid which might be termed aqueous would result, but this is distinctly an abnormal aqueous and cannot in itself be considered as the cause of abnormal tension. It is my belief, which I shall attempt to prove by slides, that the factor or factors responsible for the abnormal dilatation of the capillaries which permits of this increased elaboration of fluid into the aqueous chambers simultaneously restricts fluid escape by diminishing the size and permeability of the drainage angle.

Some observers are of the opinion that the canal of Schlemm does not normally function as an avenue of escape for the aqueous, but may function as such an avenue under stress, and then only in the capacity of a safety valve. This might appear to be a very radical departure from our earlier teaching, but when the nature of the aqueous and its relation to the blood plasma is taken into consideration it seems fairly logical. We know that a fluid that can pass through a permeable membrane in one direction can also pass in the opposite direction. The thermodynamic principles involved in maintaining the physicochemical equilibrium between the blood and the aqueous would hold true here.

The pump action theory elaborated by Thompson for the escape of the aqueous cannot be considered seriously; on anatomic grounds alone it defeats its own purpose.

In the previous paper we contended that the escape of aqueous was brought about by the same process that elaborated this fluid, the meshwork of the drainage angle acting as a permeable membrane, and that the alternate positive and negative pressure applied to the eyeball by the extrinsic musculature aided in this escape on the basis of pressure applied to fluids in equilibrium.

One may thus view the canal of Schlemm as a safety valve and accept its function as such, but when an excessive circulatory disturbance takes place this function is disabled by closure of the avenues that lead to the canal of Schlemm, through the same process that is responsible for the abnormally excessive fluid.

Space will not permit of minute detail of these and other phenomena associated with the elevation of intraocular pressure. At this time we must restrict ourselves to the cycle of events preceding and concluding with the closure of the drainage angle.

A microscopic specimen of a glaucomatous eye usually discloses a shallow anterior chamber and obliteration of the drainage angle by flat anterior peripheral iris synechiae. These adhesions show the result of compression and are frequently found to extend anterior to the entrance to the canal of Schlemm. It is a fairly well established fact that preceding this stage these flat synechiae must have passed through a cycle of events that started as mere apposition of the normally thick iris to the posterior surface of the cornea.

The uveal circulation, represented anteriorly by the ciliary processes, consisting almost wholly of fine vessels held together by a loose stroma, is confined to the very limited space of the posterior chamber. These vessels are subject to various tissue reactions, e.g. contraction and relaxation, as are similar vascular structures in other parts of the body. We know that capillary permeability is increased by capillary dilatation, also that capillary dilatation may be so marked as to permit all the fluid elements and even colloids to pass through the capillary wall.

A capillary reaction is naturally preceded by a stimulus which may be toxic, hormonal, nervous or of some

irritant nature. Capillaries react (contract and dilate) in direct ratio to the stimulus applied and the suceptibility of the tissues to that stimulus. The degree and nature of the stimulus and the reaction of the tissues (capillaries) to the stimulus naturally vary in different individuals and probably under different conditions. Krogh and others have demonstrated definite capillary reactions to definite stimuli.

Much may be said of the probable predisposing and precipitating factors associated with these phenomena, but this must be left for another time.

Visualizing the eye from this standpoint and focusing our attention on the uveal circulation and the ciliary processes in particular, we may follow the different stages preceding the classical elevation of intraocular pressure.

During normal capillary dilatation and contraction a sufficient permeable surface area is available for the normal transition of the plasma within the capillary to that of the aqueous in the posterior chamber. If the channels of fluid escape, that is, the canal of Schlemm, crypts of Fuchs, etc., are likewise normal, a state of fluid equilibrium is maintained. I am not unmindful of the physicochemical phenomena involved in this process.

The capillaries of the ciliary processes, although confined to the limited area of the posterior chamber, have sufficient space for normal contraction and relaxation. Any swelling or engorgement of these vessels must n turally crowd this space, and if excessi must push adjacent parts in the dire tion of least resistance. As a result find these parts crowding the draina area and, owing to the acute an formed by the cornea and the iris, t latter comes in contact with the form very readily.

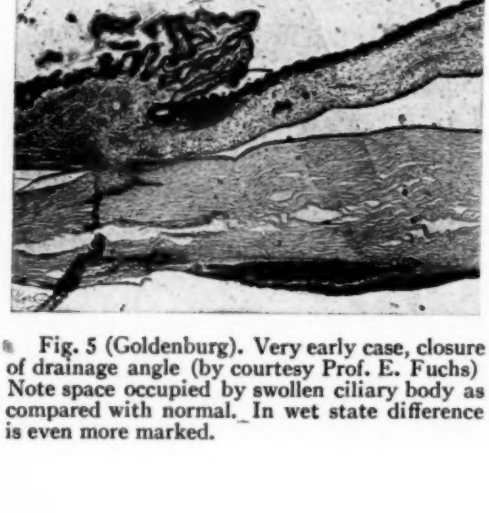

Fig. 5 (Goldenburg). Very early case, closure of drainage angle (by courtesy Prof. E. Fuchs) Note space occupied by swollen ciliary body as compared with normal. In wet state difference is even more marked.

When for some reason a toxic su stance enters the blood stream whi may act as an irritant or stimulus the capillaries of the ciliary processe they react by contraction or dilatatio If the reaction remains within reaso able limits no disturbance recognizab by the patient may take place: If t degree of dilatation of these capillari is sufficient to crowd the availab space of the posterior chamber, t mass movement will push the iris ro forward so as to disturb the free ex of aqueous humor, and the so-calle fleeting prodromal symptoms of gla coma may or may not manifest then selves. If this circulatory disturban readily adjusts itself, the symptom may be so mild and transitory that t patient may not be conscious of an thing more than a momentary blurrin of vision. However, if this circulator disturbance is maintained over a perio sufficient to permit the apposition the iris root to remain longer or to b come adherent to the cornea, with th formation of synechiae, but not wholl blocking fluid escape, the mild subacut symptoms, e.g., slight ciliary injectio and blurred vision, may be noted. Th circulatory equilibrium is usually re established or readjusts itself to its ne environment. The newly formed syne chiae may only be confined to a limite portion of the circumference of th drainage angle, but the normal avenu of fluid escape (the canal of Schlemm becomes restricted in direct ratio t synechia formation. The term "norma avenue" is used here because it is prob able that the crypts of Fuchs and th anterior surface of the iris may assum compensatory properties of fluid escap under such conditions. The synechi formation is in direct ratio to the degre of reaction of the capillaries and th degree or nature of the irritant o stimulus present. Newly formed syne

chiae may be separated or broken up by the normal functions of the body or by the use of drugs (miotics).

Thus is produced the incipient stage of the vicious circle which makes such an eye more susceptible to future circulatory disturbances and subsequent interference with free aqueous escape. Repetitions of this cycle of phenomena must eventually produce more synechiae, and with the formation of more synechiae the surface area of the canal of Schlemm becomes more and more restricted. As the condition progresses a pathology is established wherein a circulatory disturbance and reaction that would ordinarily precipitate only the mild fleeting symptoms of the prodromal stage can now manifest the symptoms of the subacute or acute type of glaucoma.

As time goes on, with the formation of more synechiae we find the interval between attacks gradually decreasing, producing the so-called chronic congestive or inflammatory type of glaucoma with symptoms continuing over a longer period and less amenable to medicinal therapy.

Given a stimulus or irritant and a tissue susceptibility of such degree or nature as to produce a most violent reaction, we may precipitate the so-called acute fulminating type without any previous prodromal symptoms whatsoever. One may therefore conclude (in a measure) that the type of case precipitated would depend upon the degree and nature of the irritant or stimulus and the capillary reaction to that stimulus, the ability of the circulation to reestablish itself and the quantitative formation of peripheral anterior synechiae. (Predisposing factors are not considered at this time.)

I am inclined to think that the many cases seen and reported during our serious epidemic of influenza some years ago may be explained on this basis. Likewise, the report of Maynard, in Calcutta, who saw twenty cases of glaucoma associated with a wave of epidemic dropsy. One could elaborate much in this direction with case citations of peculiar or unique character as a background of glaucoma.

In the previous paper on the mechanism of normal intraocular pressure, it was pointed out that the motor nervous system to the intraocular and extraocular muscular structures seemed to play the major rôle in the maintenance of normal intraocular pressure; that the sympathetic nervous system probably acted in a minor capacity as a refined regulator functioning within restricted limits. That is, in the normal production and (probably) escape of aqueous humor this system may function as a refined regulator of the capillaries of the ciliary processes, probably aiding in maintaining the capillary wall in a state of equilibrium so that it may function as a permeable membrane. But when a circulatory disturbance of sufficient magnitude is precipitated this system is overwhelmed and this function disabled; and when the circulatory readjustment takes place it is again able to act as a refined regulator.

The experimental work of Koster, Birmbacher, Cermak and others for the purpose of demonstrating that disease of the exit vessels was the causal factor of glaucoma is interesting and pertinent to the theory presented, the supposition then being that, due to disease of these venous channels, the exit blood stream was retarded and congestion of the parts drained by these vessels would result in the increased pressure. For instance, if in albino rabbits all four veins (Koster) were ligated, it was noted that a high pressure developed rapidly, the pupils dilated, the anterior chamber became shallow, particularly at its periphery, and marked swelling of the ciliary body could be seen with the ophthalmoscope. When only two or three of the vorticose vessels were ligated, the iris thickened and came forward only in the region corresponding to the ligatured vessels; and it could be observed that the ciliary body was swollen in the same region and not elsewhere.

An analysis of this experimental work in the light of our present knowledge of these vessels would seem to distinctly enhance our theory. Here we have definite proof that anterior peripheral synechiae can be produced by congestion or swelling of the ciliary processes

without the lens or vitreous playing any part whatsoever. The experiments wherein only two or three vorticose veins were ligated would seem to definitely establish the fact that synechia formation was the result of a mass movement of the ciliary body pushing the iris forward only over the region drained by these ligated or con ested vessels.

Collins and Mayou (Pathology, p. 223) state: "In the early stages of primary glaucoma, more especially in acute cases, the ciliary processes are swollen and edematous, the veins are engorged, the processes are pressed forward against the root of the iris."

Summary

1. Closure of the drainage angle is the result of a mass movement of t ciliary body, ciliary processes, and i This mass movement is exhibited in directions, but, owing to the acute an formed by the cornea and iris, t cornea being a more resistant part, t iris is pushed against the cornea.

2. The mass movement of the uv structures is the result of a congesti or swelling secondary to abnormal di tation of the capillaries which go form the major portion of these stru tures. The abnormal dilatation a congestion of these capillaries is t manifestation of their reaction to toxic or irritant substance which p marily found its way into the blo stream.

104 South Michigan avenue.

NOTES, CASES, INSTRUMENTS

DISPLACED CILIUM (a) IN THE UPPER PUNCTUM, (b) IN THE ANTERIOR CHAMBER

S. HANFORD MCKEE, M.D.
MONTREAL

Mrs. H. consulted me recently complaining that for two or three days her right eye had been irritated. Inspection showed the eye free from inflammation, except over a small area, at the inner side of the globe. Further examination showed the cause of this inflammtiona to be a cilium which had become displaced and which had entered the upper punctum for about one-third or mo of its length. It was well fixed in th position, so that with movements of t lid it had irritated the globe until t patient had sought relief. The drawi gives one a much better idea of the co dition than any word picture. (Fig. 1

Fig. 1. (McKee). Cilium in punctum.

Fig. 2. (McKee). Cilium in anterior chambe

The second case was reported b Dr. R. A. Hughes, but, as I recent found the drawing made at the time examination overseas, I am adding th to the case given above.

Captain G., of the R.A.F., came t the eye clinic overseas in 1918 for

routine examination and, an eyelash being seen in the anterior chamber, enquiry gave the following history:

At school eighteen years previously, while holding a fountain pen point upwards, a fellow-pupil pushed his desk with the result that the point of the pen went into the right eye carrying an eyelash with it. An opening in the iris, with the eyelash in situ, was very easily seen and it was noted that it was the follicle end of the lash that showed in the iris coloboma. Apart from the small corneal opacity at the point of entry and the anterior synechia, there were no untoward results. The vision, with hyperopia corrected, was normal. (Fig. 2.)

1528 Crescent street.

CILIA IN ABNORMAL LOCATIONS (ANTERIOR CHAMBER, CORNEA)

L. WEBSTER FOX, M.D., F.A.C.S
PHILADELPHIA

Cilium in the anterior chamber.—This unusual condition occurred in a young man who had sustained a penetrating wound of the eyeball about two years earlier. At that time he was under treatment at a neighboring hospital, from which he was discharged with the eye quiet but without any sight. At our initial examination the right eye showed a scar at the site of entrance and several anterior synechiae. Reaching straight down from above, where it was incarcerated in the iris, into the anterior chamber was a straight firm bulbous eyelash, the distal extremity being free. On the nasal side of the pupillary area was another much thinner, and apparently fixed by its bulbous end to the iris above, the remainder gradually tapering to a point at its free end and somewhat wrinkled. Vessels from the nasal side were visible in the cornea. This eye, as has already been remarked, was devoid of vision, and showed evidence sufficient to justify this loss of function. There had been a traumatic cataract and only some fragments of an opaque posterior capsule, presumably, remained. The pupil was small and black, but dilatation revealed the true condition. The iris was atrophic in spots and several posterior synechiae were to be seen. Indifferent light projection could be determined but the eye was regarded as useless. The presence of the cilia within the eye added nothing to the patient's difficulties, although it would have been interesting, could we have determined it, to know whether within the time they occupied this abnormal position they had occasioned any intermittent reactions.

Cilium impacted in the cornea.—The second case was also of traumatic origin. The patient had been sent to me by a colleague by reason of an unusual kind of corneal ulcer. The patient had sustained a punch in the eye about two weeks before the time of my observation. An ulcer resulted. The corneal surface was very much raised at the site of the disturbance. Near the surface but within the structure of the cornea, the high power of the corneal microscope used in connection with slit-lamp illumination demonstrated the linear opacity seen by the naked eye to be a buried eyelash. It was covered with plastic material, and its location was estimated to be between Bowman's membrane and the epithelium. The eyelash had doubtless been driven there by the impact of the blow the patient had received. Subsequent examination was denied us, and in all likelihood the eyelash sloughed out.

The great misfortune in connection with these cases is our limitation as to following them up to their logical conclusion. In the first case described the condition of the eye was apparently unaffected by the eyelash in its new location. In the second instance, the eyelash was giving rise to the same disturbance that would follow the presence of any foreign substance in that location. At the time it came under our observation it was a question whether it would not be as well disposed of by the ulcerative process as by surgical interference. It was not our privilege to observe the case further so we are in ignorance as to the ultimate development.

303 South Seventeenth street.

PARALYSIS OF DIVERGENCE

EDWIN BLAKESLEE DUNPHY, M.D.
BOSTON

This condition is relatively rare. Originally it was thought due to a spasm of convergence but it is now known to be a paralysis of a divergence factor in the complex mechanism by which central control of ocular parallelism is maintained.

Parinaud was the first to assume that divergence was an active process caused by simultaneous contraction of both external recti muscles with corresponding relaxation of both internal recti. Duane, in 1899, demonstrated the correctness of this theory. Since then occasional cases of divergence paralysis have been reported in ophthalmic literature. The etiology is obscure. It has occurred in a number of diseases including encephalitis, tabes, cerebral tumor, poliomyelitis, chorea, and lead poisoning. Apparently, any pathological condition of the central nervous system may give rise to it when the process happens to involve the divergence center. The exact location of this center is not known, but there is some evidence to show it is near the sixth nerve nuclei.

The diagnosis is made on the following points:

1. Homonymous diplopia at 20 ft.
2. No diplopia at the reading distance.
3. No increase of diplopia in the eight cardinal positions.
4. Normal ocular muscle excursions.

The following case is presented, as it is one of the few known to be associated with multiple sclerosis.

Case: George F., age 39 years, married, chauffeur, was first seen by me on Dr. Derby's service at the Massachusetts Eye and Ear Infirmary, August 3, 1927. Chief complaint, diplopia.

Past history: Always well except for usual diseases of childhood. Denies venereal disease. Has three healthy children; no deaths or miscarriages. Family history, irrelevant.

Present illness: Began to have rather severe frontal headaches twice weekly about six months ago, coming on in the morning and lasting all day. Felt nauseated but did not vomit. Five months ago, while driving a car, he suddenly had double vision when looking into the distance. The diplopia disappeared when he looked at near objects. He went to a doctor who gave him some temporary relief by putting a prism in his glasses, but the glasses "strained his eyes too much" so he removed them.

Examination: V.O.D.+1.50 cyl. ax. 105°=20/20. V.O.S.+0.25 sph.+1.25 cyl. ax. 75°=20/20. The eyes appeared slightly convergent. The right pupil was slightly larger than the left. Pupillary reactions were normal. There was a slight horizontal nystagmus when patient looked toward the left, otherwise ocular movements were normal. The fundi and media were normal. The fields were normal. There was a definite homonymous diplopia at twenty feet, which did not change in amount when the light was moved to the eight cardinal positions. This diplopia disappeared when the light was brought up to two feet from the eyes. The convergence near point was forty mm. The accommodation measured five diopters in each eye. The blood Wassermann was negative.

Neurological examination was done by Dr. Colket Caner, of the Massachusetts General Hospital. The positive findings were as follows:

1. Definite nystagmus when looking to left.
2. Left ankle jerk absent.
3. Abdominal and cremasteric reflexes absent.
4. Bilateral Babinski reflex present.
5. Slight disturbance in sense of position of toes.

Opinion: multiple sclerosis.

The patient refused lumbar puncture. On last examination, December 1, 1927, the condition was unchanged.

520 Commonwealth avenue.

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RETINAL DETACHMENT SOON AFTER A KNIFE INJURY*

GROVER H. POOS, M.D.
SAINT LOUIS

William Flannagan, seven years of age, was referred to me with a history of having been struck in the left eye with a knife about four hours previously.

Examination of the left eye revealed a penetrating knife wound one cm. long, horizontal, and anterior to the ciliary body, crossing the limbus at eleven o'clock and again approaching the limbus at one o'clock. The iris was prolapsed into the wound and there was considerable hyphema accompanied by both bulbar and ciliary injection. Photophobia and epiphora were marked. The right eye was normal in appearance and vision equaled 20/19, while with the left eye vision equaled 20/75.

The left eye was irrigated with a solution of boric acid, and after cocain anesthesia the prolapsed portion of the iris was drawn out, excised, and the edges replaced. First a two percent solution of mercurochrome was instilled and this was followed with a one percent solution of atropine. Then an eye pad dressing was applied to the left eye.

There was no complaint of pain, except some tenderness over the ciliary region, or any visible discharge. The pupil remained well dilated with an early absorption of the blood in the anterior chamber. The conjunctival and ciliary injection continued moderate, the ciliary injection remaining more pronounced at the site of the wound. Repeated ophthalmoscopic examination showed that the cornea, the refracting media, and the fundus were clear. Later a few dust-like particles could be seen on the inferior posterior surface of the cornea. A small amount of exudate appeared at the superior portion of the coloboma.

Treatment consisted of daily instillation of solutions of mercurochrome boric acid and atropine while sodium salicylate and later sodium iodide were given internally. From four to five weeks following the injury the globe remained quiet except for the stationary exudate and a slight vascularization at the superior limbus over the wound. Under atropine the vision of the right eye with +2.00 sphere equaled 20/19, and that of the left eye with +2.50 sphere equaled 20/19.

The patient returned to school after five weeks absence. Three days later, on the way home from school he engaged in a football game and was hit in the injured eye. I saw him the following day, at which time he complained of malaise, headache, and pain in the left eye. Photophobia and epiphora were again evident. The right vision equaled 20/24 and the left vision equaled 5/240 (patient crying) with a convergent strabismus of about twenty-five degrees. There was marked superficial and deep injection. The iris appeared swollen and muddy in color. The pupil remained dilated to four mm. The exudate above at the primary wound was still present and the optic disc was hyperemic, with blurred margins. Patches of yellowish exudate were visible. The retinal vessels were rather tortuous, with many hemorrhages.

The patient was hospitalized for ten days, and a general physical examination was made which included Wassermann, blood counts, urinalysis, and tuberculin test, in addition to x-rays of the teeth and sinuses. The leucocyte count ranged from 14000 to 16000. All other examinations were practically negative. Swelling of the upper lid, pain with ciliary tenderness, and marked injection continued in the injured eye, while tension remained normal to the finger test. The media became more and more turbid and the primary exudate increased steadily. The retina appeared lusterless, the vessels tortuous and darker in color.

Vision and fields declined rapidly in the left eye but continued normal in the right eye. The affected eye was

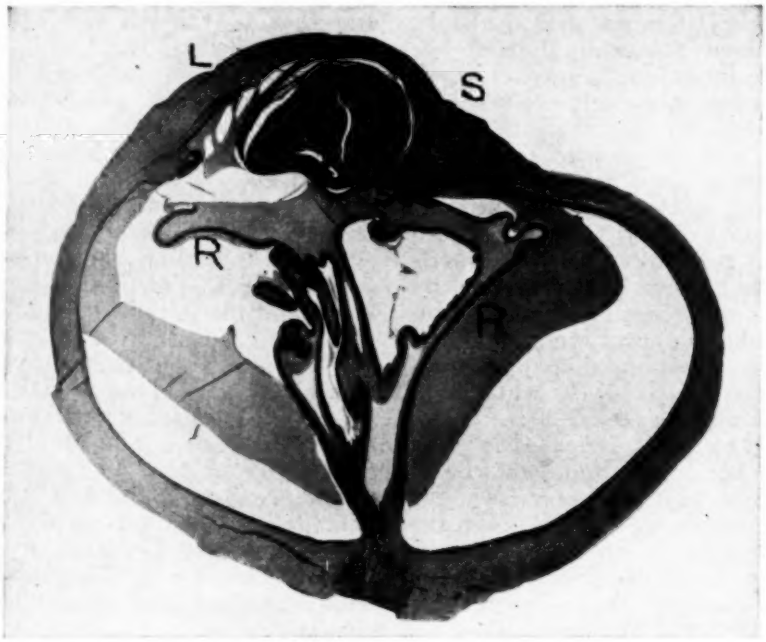
* Read at the Ophthalmological Section of the Saint Louis Medical Society on November 3, 1927.

kept under atropine and hypodermic injections of milk were given. Later, deposits upon Descemet's membrane were visible; the tension became subnormal; the exudate became organized, with posterior synechiae, and finally no details of the fundus could be seen. A very faint reflex in the lower inner quadrant was the last view of the fundus until complete loss of light perception. The vision of the right eye continued to remain normal with no injection or signs of irritation. Four months after the primary injury, the left eye was enucleated under general anesthesia. The socket healed normally.

Microscopic sections were prepared at the Eye Research Bureau maintained by the Missouri Association for the Blind at the Saint Louis School of Medicine. The following statements are extracted from the detailed pathological report made by Dr. Harvey Lamb:

The lens had been pulled anteriorly until its capsule touched the cornea, also upward by the contracting scar tissue at the superior limbus. The retina had been completely detached before enucleation.

Microscopical examination revealed that in the part of the ciliary body adjoining the position of the original knife wound there was much atrophy of the ciliary muscle bundles, and between the atrophied bundles were dense connective tissue septa. The ciliary processes at the position of the previous knife wound were embedded in cicatricial tissue and folds of detached retina. Posteriorly the unpigmented ciliary epithelium was drawn out into long thin cords of cells. The choroid was atrophic and showed much sclerosis. The completely detached retina had even been torn from its attachment at the ora serrata.



Retinal detachment after injury (Poos).
Vertical section through entire eyeball (under very low power), showing *S*-band of scar tissue along tract of knife-wound, which has pulled *L* (lens) forward and upward and completely detached *R* (retina) even from the ora serrata.

Conclusions: The knife wound passed through the superior limbus and then downwards and backwards just behind the lens. The cicatricial band of tissue forming in the tract of this wound gradually pulled the lens forward and upward. There would thus result a pulling forward also of the vitreous humor. Attached as the vitreous is,

not only to the lens anteriorly but to the retina behind, it is easily seen how a blow upon the eye would precipitate retinal detachment. An atrophy in the uveal tract followed.

301–302 University Club building.

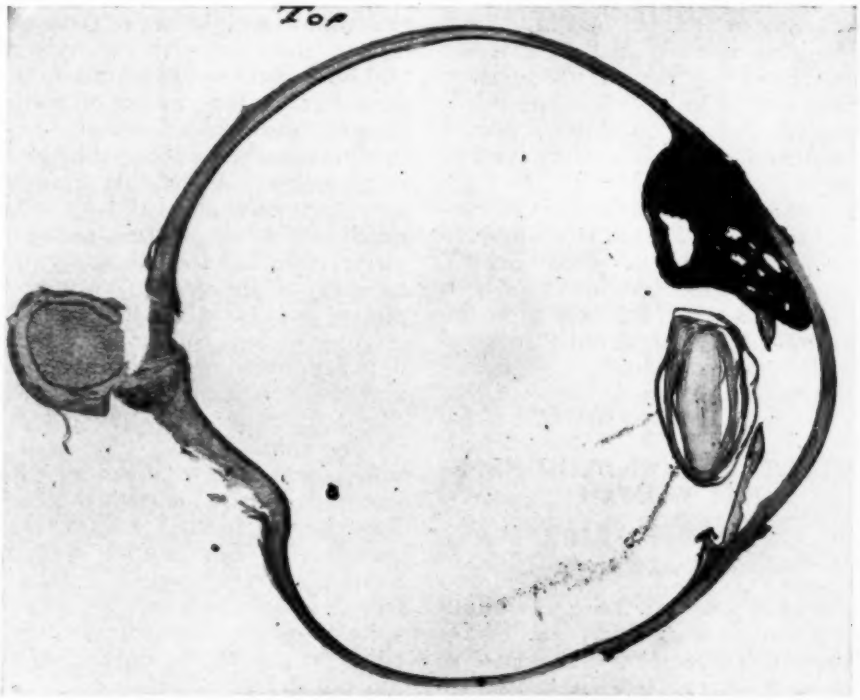
SARCOMA OF IRIS

WALTER F. HOFFMAN, M.D.
SEATTLE

September 28, 1926, Mr. H. D. F., tall well-nourished male. On undergoing examination at Veterans' Bureau, preliminary to possible thyroidectomy, the examiner discovered a small tumor of the iris of the right eye. Patient complained of frontal headaches, worse in the evening, but no other symptoms.

A small dark brown tumor in the anterior chamber about 5 mm. in diameter, apparently arising from the root of the iris at 12 o'clock, extending down to the upper edge of an undilated pupil. The growth was somewhat nodular, flattened by being confined between the cornea and the iris. No increase in vascularization of the sclera in the vicinity. No increase in tension. The tumor was apparently opaque. Right vision 6/50, +1.00 sph. +0.50 cyl. ax. 75° = 6/10; Left vision 6/8–2, +0.50 sph. +0.50 cyl. ax. 105° = 6/5.

Ophthalmoscopic examination: The media were all clear, and the fundus, examined through an undilated pupil, presented no pathology. However, when the pupil was widely dilated, a dark mass could be seen extending back from the tumor area.



Sarcoma of iris and ciliary body (Hoffman).

Diagnosis: sarcoma of the iris. Advised immediate enucleation. As patient was going to Veterans' Hospital for observation in regard to thyroid, I suggested that he have the eye enucleated at that time. This man was presented to the local eye and ear society and several of the men who saw him at that time suggested an iridectomy. However, they did not have the advantage of a careful ophthalmoscopic examination and were not cognizant of

the fact that the tumor mass extended behind the iris.

October 19th patient returned without having been operated upon, although the oculist at Veterans' Hospital advised enucleation. October 20th the right eye was enucleated. Progress uneventful. Socket in good condition and clean. Eye sent to Army Medical Museum for section and diagnosis.

Pathologist's report: "Eye presents deeply pigmented crescent-shaped tumor mass at the limbus and on section it extends behind and includes the ciliary body, extending approximately to the edge of the ora serrata." Histological report: "Spindle-cell melanosarcoma apparently arising in ciliary body projects forward into the anterior chamber involving the iris throughout its extent except for its inner one-third. Deep cupping of the optic disc. Secondary glaucoma. Vessels of nerve are patent."

January 19, 1927, patient given correction for left eye. Seen from time to time since and is in good health. January 10, 1928, patient was seen just a few days ago, a full year after the enucleation and is apparently in good condition in every respect.

817 Summit avenue.

COMPLETE COLOR BLINDNESS IN A WOMAN

ARTHUR G. BENNETT, M.D., F.A.C.S.
BUFFALO, NEW YORK

It has been asserted that color blindness in a woman is unknown and I have never seen this statement challenged, so the following is reported with a view to putting on record one case of complete color blindness in a woman:

V. S. aged 25 years, has been under my care since October 16, 1904, when she was two years old. She was then brought to me by her parents because she seemed to have defective vision. Examination disclosed a marked lateral nystagmus, and under atropine cycloplegia a high degree of astigmatism. Owing to her tender years and apprehension only a very incomplete refraction was possible, but two years later I was able to disclose R.E.+1.00 sph.+4.50 cyl. ax. 105°, L.E.+4.00 sph.+2.00 cyl. ax. 75°. These lenses less +0.50 sph. were ordered.

October 31, 1908, another cyclopegic examination showed R.E.+0.50 sph. −3.00 cyl. ax. 15°. V.=6/45, L.E. +3.00 cyl. ax. 75° V.=6/45. About this time the child began to amuse herself by drawing with colored crayons, and her parents showed me some of her drawings. Her choice of colors was bizarre, and created ridicule from her brothers and sisters, but they looked all right to her. As by this time she was only six years old, I did not pay very much attention to this phase of her vision, thinking it might be simply due to lack of instruction, but today in testing her I find she has absolute lack of color sense. She cannot distinguish between red, green, yellow, and blue, and she tells me that any picture looks like a photograph, some colors being darker than others. She is a highly intelligent young woman now—conducting a business of her own successfully—but cannot trust herself to buy her own hats or choose a dress for herself, having to rely upon her relatives or friends. Her vision has not improved in spite of constant wearing of her refractive correction, but on the other hand has not deteriorated.

I wish this case to go on record to disprove the statement that women are never color blind.

150 North Pearl street.

SOCIETY PROCEEDINGS

CHICAGO OPHTHALMOLOGICAL SOCIETY

December 19, 1927

ROBERT H. BUCK, president

A case sustantiating the relaxation theory of accommodation.

DR. ALBERT L. BROWN (Cincinnati) presented this case on account of the unusual opportunity afforded to study a phase of the mechanism of accommodation. (See full report of case, in the May issue.)

Discussion. DR. HARRY GRADLE said that with the slit-lamp it was difficult to examine the eye closely on account of the excessive magnification even with low power, as the examination had to be made through a portion of the cornea not perfectly clear on account of the scar resulting from iridectomy twenty years ago. With the hand slit-lamp and to a lesser extent with the Gullstrand ophthalmoscope it was possible to see the bundle of zonular fibers very clearly, though it was not possible to define the exact insertion into the capsule. It was well known that the larger number were inserted into the anterior capsule, the smaller number going into the equator, and in all probability the bundles seen were a combination of those on the anterior surface and those on the equator. A rather unique phase of the case was that the patient had been trained to exercise accommodation at will. He could relax and by a mental effort could accommodate, and, therefore, could work the ciliary muscle as desired, and the change in the shape of the lens and the periphery of the lens could be observed at will. The edge of the lens became serrated. In view of the fact that the fibers were not inserted in a continuous row but gathered into bundles, when the patient attempted to accommodate these bundles became flaccid and the equatorial edge of the lens lost the serrated appearance and became more uniform. This, of course, tended to bear out the hypothesis advanced by Helmholtz. Helmholtz really advanced his theory of accommodation as a hypothesis; he did not dignify it with the title of theory. It was only his fervent adherents of later years who accepted the master's word blindly and advanced it to a theory. The case presented tonight should stand as clinical evidence in support of the original Helmholtz hypothesis.

Dr. Chapman was quite sure that he had seen the crenations. These crenations appeared when the patient looked near, or else he and the patient were not cooperating.

Dr. Robert Von der Heydt had had no difficulty in seeing it by means of retroillumination. By throwing the light so that it would be reflected from the absolute equator of the lens, a reddish band appeared at the equator. With the hand slit-lamp the zonule fibers were thus seen illuminated from behind. He was practically convinced that there was a change such as Dr. Brown described.

The closure of the drainage angle.

DR. MICHAEL GOLDENBURG read a paper on this subject published elsewhere in this Journal (p. 290).

Discussion. Dr. Oslund (from the Department of Physiology, University of Illinois) said that in tracing the production of aqueous humor and its disappearance from the anterior chamber following the injection of dye into the blood stream, it had been found that the aqueous humor came from the capillaries. In that much there seemed to be common agreement. The question was, where did the aqueous humor escape? From the same dye experiments there appeared to be two avenues of escape, (1) through the canal of Schlemm and (2) back through the capillaries. The

difference between the aqueous humor of a normal condition and that of a pathological condition was important. With capillary dilatation there was increase in the protein content and increase in the osmotic pressure of the aqueous humor. Normally plasma had a greater osmotic pressure than that of the aqueous humor. The aqueous humor was produced because the arterial pressure was great enough to overcome the force of the resisting osmotic pressure. Part of the same aqueous humor returned via the venous side of the capillaries where the blood pressure did not overcome the natural osmotic attraction of the plasma for the more liquid aqueous humor. Where there was an increase in the colloid content of the aqueous humor, that difference in osmotic pressure between plasma and aqueous humor that favored escape of the latter into the venous part of the capillaries no longer existed. Exit through the canal of Schlemm only remained. An increase in intraocular pressure followed.

According to Dr. Goldenburg there resulted an enlargement of the ciliary body which by pressure upon the adjacent tissue closed the canal of Schlemm. Wherever there was capillary dilatation there was an increase in size of that organ or tissue. Whether the ciliary body would actually shut the canal of Schlemm, however, was questionable. There was such a possibility, and that possibility was supported by one type of glaucoma wherein there was no increase of aqueous humor but an increase in the size of the ciliary body, with capillary dilatation or with arteries increased in size. That would support Dr. Goldenburg's hypothesis that the ciliary body did close the canal of Schlemm. The other group of glaucoma cases showed the other side of the story. There was an increase in aqueous fluid in most cases of glaucoma.

Dr. Harry Gradle said Dr. Oslund spoke of the increase in colloidal content in the anterior chamber during glaucoma. There had been a good deal of work done along that line, some of it in England, and it was his impression that the colloidal content of the aqueous humor during glaucoma was decreased. The formation of the aqueous was not so simple. The work of Leber, Hagen, Seidel, and Hamburger was still inconclusive. Certain it was that we were not thoroughly familiar with osmotic pressure and it was impossible to state the exact relationship of the two. The talk on capillaries was extremely interesting, but he questioned whether conclusions that might be reached from the study of other places in the body held for the eye. He had had occasion to study capillaries of the conjunctiva in renal disease and they did not conform in the slightest to the capillaries in the skin which were diagnostic of the condition. It was impossible to more than conjecture upon the action of the capillaries in the ciliary body.

In regard to Dr. Goldenburg's theory of the closure of the drainage angle, it was always pleasant to meet an old friend dressed up in new language and the theory of Knies-Weber, presented in 1876, had been reintroduced garbed in a new verbiage.

Dr. Petersen (Department of Pathology, University of Illinois) thought Dr. Gradle was correct in saying that capillaries in one part of the body could not be compared to those in another part, and in addition the musculature of the capillaries did not need to be a criterion of the status of the endothelial cells. He had seen cases in which there was distinct evidence of capillary constriction but in which the capillary wall was more permeable than normally. That type of dysfunction occurred occasionally in the acute infections.

Dr. Goldenburg (closing). In regard to Dr. Gradle's statement that the theory was first presented in 1876, he could not reconcile such a statement with fact. The contractile cell was first discovered by Rouget in 1873, but for some reason did not receive favorable consideration and nothing further was heard of these cells until 1903, when Sigmund Mayer discovered them. Schaly had published a monograph in which he reported the

presence of Rouget cells in the human eye, and demonstrated them in every intraocular structure having blood vessels, as well as in the conjunctiva. An abstract of this paper was published in the American Journal of Ophthalmology, September, 1927.

Simplified phacoerisis

DR. W. A. FISHER said that if phacoerisis could be safely done by the average operator it would be generally adopted because of its advantages, viz., less vitreous loss, the minimum of trauma, of postoperative inflammation, and of iris prolapse; as well as the fact that no secondary operation was required and less time was spent in the hospital. The chief objections offered by competent operators were the difficulty of placing the instrument properly upon the lens, the liability of catching the iris, and tumbling of the lens. These obstacles had been overcome in the method described in his paper, and this simplified technique was suggested with the hope that it would benefit others in the removal of senile cataracts in their capsule. The principal points in the paper were: (1) The pupil was made widely dilated and tumbling was eliminated; (2) The conjunctival suture was tied before peripheral iridectomy was done; (3) The peripheral iridectomy was made at the point of puncture or counterpuncture after the pupil had contracted.

Discussion. DR. HARRY WOODRUFF said that it was doubtful if any method of intracapsular extraction could be considered simple. There was a hazard in placing the cup upon the lens and in the use of the vacuum. This was lessened by securing the wide dilatation of the pupil recommended by Dr. Fisher, in that the iris was not so apt to be engaged. But making the peripheral iridectomy where Dr. Fisher made it, at the angle of the corneal incision, could have little effect in preventing prolapse of the iris above. He would advise leaving the iris entirely alone. The conjunctival suture was a real safeguard after it was successfully made, but there was a hazard in the making of it and much skill was needed in its performance. Should vitreous be lost before the lens was delivered, it would be better to stop. Dr. Gifford once wrote a paper on "Backing out of cataract operations". If one would wait from two weeks to a month or more, it would often be possible to remove the lens without further loss of vitreous. The hook designed by Dr. Schwartz for expressing the lens in either method might possess some advantages. It adapted itself to the curve of the globe when placed over the ciliary region below in the usual situation where pressure was made.

Dr. V. A. Chapman had been doing the so-called Barraquer operation for over four years and found it very simple. He had always used the technique described by Dr. Fisher, except that he did not handle the conjunctival flap in the same way. He had had no difficulty in placing the vacuum cup upon the lens, by looking through the cornea. He used a double armed suture which closed the wound by a mattress stitch. The lens was removed by lifting it out through the dilated pupil and sclerocorneal incision, upper margin of lens presenting first. He saw no reason for doing an iridectomy and had done none in his cases. Instillation of a myotic at the close of the operation kept the iris margins free from entanglement in the incision wound.

Nothing had been said about the type of cataract most suitable for the operation described by Dr. Fisher. The very hard lens was difficult to remove by means of the erisifake, because of the difficulty in making air tight contact to a smooth hard surface. The soft lens was the least difficult because of the ready air-tight adjustment to the vacuum cup. As a matter of fact, any type of cataractous lens could be removed by the Barraquer method. He had tried the method in as many types of cataract as he could find and had not found disaster more likely to occur than by any other method. A slide showing some different types of lens removed was shown.

Dr. O. B. Nugent wished to emphasize the necessity of sewing the conjunctival flap before the toilet was made. He had noticed that when vitreous was lost it was while attempting to do an iridectomy in a pupil that was overdilated. When the conjunctival flap was in place the loss of vitreous was practically nil.

Dr. Michael Goldenburg asked Dr. Fisher if he went through the whole thickness of the lid when making the suture for lid fixation; also whether he had ever tried passing a thin knife through the iris as in transfixation, instead of using iris forceps and scissors.

Dr. W. A. Fisher (closing) said, in regard to Dr. Woodruff's objection to peripheral iridectomy at the point of puncture or counterpuncture, that iris prolapse was usually at the puncture or counterpuncture and the peripheral iridectomy was made to prevent it. Morphine scopolamin might be desirable in one way as an anesthetic, but was undesirable in general because the patient was often made quite ill, and if given enough was made sleepy and would not cooperate. One instillation of a 50 per cent solution of cocain in adrenalin, freshly made, usually produced very satisfactory anesthesia. In reply to Dr. Goldenburg, the skin suture was not passed through the whole thickness of the lid, but through the skin, and loosely tied. If a thin knife were passed through the iris, transfixing it, the net result would be vitreous loss and hernia of the vitreous.

Robert Von der Heydt,
(acting) Corresponding Secretary.

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

December 20, 1927

Dr. E. K. Ellis presiding

Unusual fundus picture.

Dr. George S. Derby presented the case of Miss I.B., seen first June 10, 1927, with the history that sight had always been poor, but that it had failed noticeably for the past year. Vision with correcting glass was 5/21 right and left. Media were normal, the nervehead was normal, vessels of a good size. The striking feature was the general appearance of each fundus, especially in the region of the nervehead and macula. There were large numbers of rather small irregular grayish spots, sometimes round, sometimes oblong, sometimes oval, situated fairly deep. These were not seen directly in the macular region. They surrounded the disc and extended fairly well out in the retina. In the periphery of the retina the spots were less frequent. The patient had been examined several times and it seemed probable that the condition was a congenital one.

On December 13, 1927, the findings were the same as at the previous visit.

Exophthalmic goiter and atrophy of the optic nerve

Dr. George S. Derby presented a woman of 45 years, who noticed two years ago that the vision in the right eye was poorer than that in the left eye. Since then it had steadily failed. She was seen first in August of this year (1927) at which time the vision in the right eye equalled counting fingers at six inches. Only a small part of the nasal field remained. The eye diverged 10 to 15 degrees and showed 4 to 5 mm. of exophthalmos. The palpebral fissures were of equal width. There was a well developed primary atrophy of the nerve. The left eye was normal. Patient had her nose operated on for a deviated septum one and one-half years ago. The general physical examination and neurological examination were negative. Wassermann was negative, as was x-ray of head. There was but slight limitation of movement of the eye. The probable diagnosis was new growth of the optic nerve and the question came as to what procedure it was best to adopt.

Nasal examination including x-ray by Dr. MacMillan was negative in August. Since being shown here she was seen again by Dr. MacMillan and another x-ray taken which showed a very definite involvement on the right side of the nose, which was now absolutely filled up with a new growth, involving

the ethmoid and sphenoid and probably extending into the orbit. Dr. Herman, who saw the case at the Huntington Hospital, said this was a meningioma and that it was inoperable.

External ophthalmoplegia and sudden loss of vision

Dr. George S. Derby presented a colored female, 38 years of age. For three months she had had occasional extremely severe attacks of pain in the right temple. Ten days ago she had a very severe attack of pain followed by blindness, complete external ophthalmoplegia, and about four millimeters of exophthalmos. Since then the condition had not changed. She had almost no movement of the eyeball. Fundus was negative. Since that time there had been occasional attacks of pain but no change in the paralysis or the appearance of the eye. The left eye was normal. The neurological examination was negative except for the eyes. The x-ray showed thickening of the ethmoid and antrum. The antrum was washed out. The blood Wassermann reaction was positive. As to the diagnosis he suspected that there might be an aneurism in the region of the cavernous sinus. He had also thought of a gumma. X-ray of the skull was negative. The right optic foramen measured four millimeters and the left measured five millimeters.

Under injections of arsphenamine a remarkable improvement of the lid and eye movements took place in a month. The lid was now up over half way and the eye moved moderately well in all directions. The vision had not improved.

Congenital amblyopia

By invitation, Dr. Theodore Terry gave a report of cases of bilateral familial amblyopia limited to females. Three of a family of seven children showed a bilateral amblyopia, the fourth girl and the three boys having normal vision. The family history was negative for amblyopia, for strabismus, for nystagmus, for any sort of congenital anomalies, and for consanguinity. The father, the mother, and the three amblyopic girls were submitted to a neurological study which was entirely negative. Blood and spinal fluid Wassermanns were also negative. The children were impulsive, rather highly excitable, and had moderate emotional instability. The oldest girl had a highly arched palate and adenoid facies, and talked as if she had ankyloglossia.

The male children were bright and did well in their school work. The two older amblyopic girls were students at an institute for the blind and they also did well in their work. The female children who had the amblyopia showed their poor vision from birth. They were unable to fix, and had photophobia of a small amount; they were unable to pick up objects where vision was required, and could never recognize their parents except by sound of voice. In these points the baby girl was quite normal. She fixed well and followed a light or bright object, and her pupils responded rapidly to light.

The amblyopic children showed a sort of searching nystagmus, an inability to fix, and the pupils reacted very slowly to light. Reaction to convergence could not be obtained because the amblyopes were unable to fix or converge voluntarily. Vision for them was approximately fingers at one foot. At very close range (a few inches) they were able to recognize and name objects such as a match, a key, a coin, or a watch. They made frequent mistakes in recognizing colors, confusing blue and green. Glasses did not improve their vision appreciably. The fundus picture was normal. There was some tesselation. The nerve head showed neither atrophy nor pallor. Skiascopy revealed a compound hypermetropic astigmatism.

A search of the literature did not reveal any similar familial condition. The picture suggested rather definitely a familial amblyopia of the females. This was, however, made a bit less impressive by the good vision of the baby girl. Further, it was not impossible that another year or so might completely ruin the picture by producing an amblyopic boy.

A survey of the children failed in an attempt to find a definite neurological lesion. The pupillary response, though sluggish, and the normal discs ruled out a lesion of optic nerve, chiasm, and tracts. An ability to recognize and name objects at close range tended to rule out any cortical or optic radiation lesion. The remaining possibility was a congenital defect or absence of rods and cones, or possibly of the cones alone.

Retinal hemorrhages with loss of vision following use of emmenagogue

DR. S. J. BEACH reported the following case of a patient, female, 28 years old, married, who was seen two weeks after sudden onset of blindness in right eye. She had taken an overdose of an emmenagogue containing savin, ergot, aloes, and cottonwood bark. Dizziness and collapse followed at once, and she recovered to find vision gone in the right eye. The left eye had been impaired three years before by kidney trouble at second parturition.

Fundus O.D. showed congestion of the disc with vague landmarks. Veins were greatly swollen and twisted in and out of the edematous retina. Innumerable small retinal hemorrhages showed, but most thickly in the region of the macular branch of the inferior temporal vein. The left eye showed irregularity in contour and caliber of retinal vessels.

Nothing significant appeared in her blood and other laboratory examinations. Treatment with massage and sweating resulted in no improvement in the condition.

Fraudulent apparatus for self-fitting of glasses

DR. S. J. BEACH exhibited an apparatus which consisted of a graduated rule on which was a sliding member containing a small near chart. At the other end was a stationary lens through which the patient looked, sliding the chart until he could read comfortably. Then by reading the number on the rule he was supposed to give the strength of reading glasses needed to order.

Case of oxycephaly

DR. A. M. DEAN presented the following case: M.S., male, aged six years, came to the infirmary a month ago complaining of poor vision. It was found at that time that he had exophthalmos, divergence, and inability to fix, and that he could recognize objects at about two feet. Examination of the fundus showed a thinning of the retina, marked atrophy of both discs, and considerable tortuosity of the retinal veins. It was noted that the patient had a short, high skull. He was referred to the neurological department of the Massachusetts General Hospital.

The boy's history dated back three years. The beginning was associated in the parents' minds with an attack of pneumonia. Since that time he had repeated headaches and vomiting. It was thought that the vision was poor, particularly to the left, for the past two years. The attacks of headaches and vomiting had increased lately. The failure of vision to the left, if true, was difficult of explanation.

The family history was absolutely negative for any similar trouble.

The neurological department had asked for x-rays the negatives of which were shown. They showed marked convolutional impressions indicating moderately high chronic increased pressure. Ethmoidal suture was visible, others not seen. Sella was not well seen, with a suggestion of irregularity at the base near the posterior clinoids. Lumbar puncture showed an initial pressure of 230, a rapid jugular rise to 570 with a fall to 230. After removal of 5 c. c. the pressure was 190, and 140 after 10 c. c. Further examination showed absent knee and ankle jerks and a questionable Babinski on the left.

The diagnosis of oxycephaly seemed certain. The question of a decompression arose and on the findings of the lumbar puncture a right subtemporal decompression was done. It was found that the brain was under considerable pressure, and examination of the suture lines showed them to be markedly thickened with long spicules

of bone extending inward and pressing on the dura. The boy had done very well. A few days after the operation he lost some fluid through the wound and it had to be resutured. On this account we were asked to take the surgeon's word that the decompression was under considerable tension.

X-ray had been taken to measure the optic foramina. The right canal was reported four millimeters in diameter.

In relation to the proper treatment of a given case of oxycephaly, it was interesting to note the normal circumference of the head at different ages—in large measure an indication of brain growth. A boy of six years should have a circumference of 20.5 inches or approximately 95 per cent of brain development. The operation here was to allow then for the present increased tension and another 5 per cent of brain growth as factors in future damage to the optic nerve.

Gliomatous detachment of retina?

DR. S. H. WILKINS presented the following case: Baby, sixteen months old, was brought to the clinic last September. The parents gave no particular reason for bringing it to the clinic except that sometimes while looking at one the infant turned its eyes upward. Very little history of importance was obtained.

The external examination of the eyes revealed nothing abnormal, except for the fact that when the baby attempted to fix an object directly center front it tended to turn its eyes upward. Upon examination of the right fundus a large separation of the retina above with large vessels coursing toward it was discovered and in the left eye, similarly placed, was a smaller retinal separation.

Transillumination was rather poor; tension was normal. It was thought that the condition might be a bilateral glioma of the retina in the first or quiet stage. The infant was seen in December by Dr. F. H. Verhoeff, who considered the condition to be due to glioma of the retina in both eyes. X-ray and radium treatment was advised in lieu of operative measures which the parents were unwilling to permit.

Interstitial keratitis

DR. MAUD CARVILL presented this case, which was of special interest because there had been an interval of five years between the first and only attack in O.D. and the onset of the first attack in O.S. The patient was seen November, 1922, when nine years old. O.D. showed a characteristic attack of interstitial keratitis which lasted three months. March, 1923, V. O.D. was 20/20 and V. O.S. was 20/20. Slit-lamp showed slight opacity of the upper part of the right cornea, with deep vessels. The left cornea was normal. Fundi showed no choroidal involvement. This was the first trouble she had had with her eyes.

When first seen in 1922, she was referred to the Massachusetts General Hospital and was reported clinically and serologically positive for congenital syphilis. She was given a course of neoarsphenamine. After the sixth injection she had marked reaction. She was put on mercury inunctions, and mercury and chalk pills were taken most of the time for the next four years. April 24, 1923, the Wassermann was strongly positive. November 16, 1926, April 23, 1927, and July 12, 1927, Wassermann was negative. November 16, 1927, a characteristic attack of interstitial keratitis developed in O.S. Patient was referred to the Massachusetts General Hospital, and a course of neoarsphenamine was started. In December the Wassermann was reported weakly positive.

In a paper on interstitial keratitis presented at the Section on Ophthalmology of the A.M.A., in 1925, by Drs. Carvill and Derby, they reported that in 162 cases the eyes were attacked within a few weeks of one another while in 55 cases the eyes were involved simultaneously. In 17 cases of 100 cases which received intensive antisyphilitic treatment, the second eye was not involved for more than one year after onset in the primary eye. In one case this interval was seven years two months; in two, five years; in two, four years; in four, three years; in three, two years; in two, one year.

Serum disease and serum accidents

DR. W. H. LOWELL, feeling that a note of warning should be sounded in regard to the employment of large doses of serum, reported the following case: The patient was admitted to the hospital for operation for cataract in the left eye. General condition, examination, and history showed no pathology. Combined extraction was done without incident. Four days after the operation the iris was discolored, and there was ciliary injection and a slight amount of chemosis. The next day some exudate was present in the anterior chamber. Following the usual method in administering foreign protein after a negative skin test, diphtheria antitoxin was given, two doses on succeeding days and the last dose three days after the second dose. Four days after the final dose constitutional symptoms developed, with rise in temperature and throat reddened. Six days later, the patient was transferred to the Massachusetts General Hospital. His general condition was bad. Although a definite diagnosis of serum sickness was made, the eye was white and quiet. There were blebs and hemorrhage on the legs and the throat was inflamed. The patient died later of bronchopneumonia.

DR. FREDERICK T. LORD, by invitation, read a paper on this subject.

Discussion. DR. F. H. VERHOEFF: I am very much interested in this subject, as I have probably given more antitoxin for conditions other than diphtheria, more often, and in larger doses than anyone else. I have given it only in cases in which I thought there was danger of blindness, especially in sympathetic cases and in cases of infection over which we had no control otherwise. I have given, as a rule, 20,000 units every day for a week. The patient almost never becomes sensitive within this time. I had one patient with tuberculous iritis to whom I gave antitoxin for one month, every day except Sunday, without any symptoms of anaphylaxis. The patient is always tested before the first injection, and, if found hypersensitive, the injections are given in divided doses over a period of four hours. I have had severe reaction with high fever in only two cases.

DR. LORD asked what Dr. Verhoeff's theory for the use of antitoxin was?

DR. VERHOEFF said no horse had ever had sympathetic. If any alien serum was injected into the blood it gave the patient a fever and stirred up his resistance.

W. HOLBROOK LOWELL,
Reporter

ST. LOUIS OPHTHALMIC SOCIETY

November 25, 1927

DR. JOHN GREEN presiding

Medical treatment of cataract

DR. J. H. GROSS reviewed the work of Dr. A. Edward Davis in the use of a cytolytic serum and discussed the questions of lens specificity and chemical composition of lenses. He also referred to Dr. John F. Fulton's use of mercury cyanide 1/5000 conjunctival instillations.

Discussion. DR. B. Y. ALVIS said that he had observed, in several cases which came to operation with vision somewhat impaired in the unoperated eye, that after the operation, which was preceded by a search for and possibly the removal of some focal infection, a number of these cases obtained much better vision in the unoperated eye than previous to operation. These were patients well up in years. That had led him to feel there was some definite basis in focal infection and the patient's health, aside from his getting old.

DR. JOHN GREEN: In every incipient cataract it is important to know the general physical status. No one can speak with certainty of the rôle of focal infection, but, on general principles, all accessible focal infections ought to be eliminated. Some of them are difficult to detect and not easy to eradicate, e.g., infections in the gall bladder, in the pelvic region of women, and in the prostate gland. When practical, I always treat these patients in association with an internist. I believe in very thorough refraction in

cases of incipient cataract, not in the hope of retarding the process but to secure the highest possible acuity. Usually a spherocylindric combination that yields the highest acuity will also be most acceptable, but not always; sometimes simple spheres only are tolerated. Retesting every three months is advisable. Subconjunctival injections of mercuric cyanide are useful in diffusely hazy lenses and in incipient cortical cataract with interstitial haze. A number of cases of this sort have been greatly benefited, having shown a gain of two or three letters with reduction in dazzling when facing lights. In some cases of early cataract associated with syphilis, intensive antisyphilitic treatment combined with sodium iodide and dionin locally has helped check the process. One such patient, under observation for nine years, has lost only one letter and still has very good reading vision.

Dr. W. F. Hardy remarked that he had had no experience with the Davis treatment, but had tried a number of other measures which had been recommended, including dionin locally, KI and NaI taken internally, and subcutaneous injections of HgCN; but none of them he felt had any influence whatever on the progress of the case. In the last year he had read some literature sent out by Fougera and Company, a firm marketing a French product, an ointment containing calcium and iodin, and he had used it on several dozen cases. He and Dr. Flury had probably 25 cases still under treatment. At times they felt some of them had had the progress stopped; and at times they felt it was a cessation that would have taken place had no treatment been instituted. After cataract had progressed to a certain extent he felt that no measure had any influence in staying the progress of the disease.

Dr. M. W. Jacobs said that he had used the Davis serum on two patients who had had iridectomies done for glaucoma. The vision was now just what it was when he began the treatment; certainly not any worse.

Dr. Wm. H. Luedde said that he thoroughly believed in what Dr. Gross had brought out, that we should discard the term "senile cataract." He thought there was a cause aside from simple senility which should be sought. A cataract should be investigated from every standpoint including the endocrine system. He had seen a patient in whom removal of an abscessed tooth had cleared the vision and arrested marked cortical lens changes. Since then he has inquired of cataract patients whether they have infected teeth and have had x-ray pictures made. He recalled another patient who came with two-thirds of the lens opaque at the age of 61 years. Her recent vision was better than it had been fourteen years ago (20/30 in each eye) with the proper correction. In that case the first thing he did was to go over the teeth carefully. The medical management of cataract cases was important.

Dr. W. E. Shahan said that he still felt that, in the majority of cases of ordinary senile cataract, if we could discover the cause of the cataract we could discover the cause of getting old. It might be compared with such changes as gray hairs and bald heads. He had considered the use of lens substance in cataract therapy in accordance with Dr. A. E. Davis' investigations but could never convince himself of its probable value. The duration of cataract formation was so variable as to make it practically impossible to determine the retarding effect of any agent used in connection with it. He had on record a case of Dr. John Green Sr.'s in which changes were recorded by him forty-five years before operation was indicated. In younger people, cataract was likely to be due to some special pathological cause for which serious search should be made.

Dr. Meyer Wiener had seen a number of cases which apparently were checked by removing the source of focal infection. He thought it was jumping at conclusions simply because one had used a certain medication to say that it had influenced the checking of the cataract. He recalled one case of traumatic cataract in which there was marked impairment of vision. The

man held accident insurance and received compensation for one-half loss of vision. Dr. Wiener saw him a year or more later and his vision was almost normal, although nothing at all had been done. He had a definite rupture of the capsule, and opacity so extensive it was impossible to get a view of the fundus. Now the lens was perfectly clear. On removing the parathyroid in rats, they all developed cataract. So the glands undoubtedly had some effect in keeping the lens clear.

DR. GROSS, in closing, said that regarding the danger of the Davis treatment, he thought there was not very much danger to the patient in the way Dr. Davis used the treatment now by subdermal injections. The patient could be tested by very minute injections and his resistance tried before larger injections were given. The working out of the alpha and beta crystallins might be of value in that they were more stable.

Eye findings after retinal hemorrhage in the newborn

DR. JACOBS reported again on his investigation of retinal hemorrhages at birth. Of a series of twenty-three patients who had retinal hemorrhages at birth thirteen were examined between three and one-half and five and one-half years after the first examination. No pathology was found in the eyegrounds of any of these patients, and defective vision, when present, was due to errors of refraction. Apparently, retinal hemorrhages at birth, unless very large, have but little influence on ocular efficiency.

Discussion. DR. JOHN GREEN said that a recent similar study by Rowland indicated a much lower incidence of retinal hemorrhages in the new born —3 per cent. A much more frequent finding was diffuse haziness of the discs.

DR. GROSS asked Dr. Jacobs whether there was any scar of degeneration left in the retina where those hemorrhages had been.

DR. HARDY asked Dr. Jacobs how many of his cases were of macular hemorrhage and if the vision was less in these than in any of the others. The reason he asked was that one encountered perfectly normal eyes, with no error of refraction, in which there was an amblyopia and no means of accounting for it. In some cases he believed hemorrhage at birth which had disappeared and left no visible scar had destroyed enough ganglion cells to account for the lowered vision.

DR. SHAHAN asked Dr. Jacobs if these cases of retinal hemorrhage were due to unusual mechanical disturbances such as difficult or instrumental delivery.

DR. M. W. JACOBS, in closing, said that the original paper was instigated by a paper which was published about 1912 in which a series of cases were examined. The authors came to the conclusion that hemorrhages were found very definitely in certain eyes according to the type of presentation. In his conclusions Dr. Jacobs could not confirm the findings of the earlier investigators. The presentation, the length of labor, and all the factors that entered into the question of labor seemed to have no specific bearing. He found that some of the children with the largest hemorrhages were born in the shortest time; some with the smallest hemorrhages were children whose mothers had been in labor three days. The causation must be a complex thing. There were no evidences of injuries of the retina in any of these children when examined during the past year with the ophthalmoscope. Regarding macular hemorrhages, he had one child definitely in mind. In this patient the clots cleared up within ten days. During the two years he was examining these patients that was the only case of twenty-three in which he found a definite, good-sized clot. All the other cases had smaller scattered hemorrhages more or less deep and not in any definite place.

The striking thing about newborn infants was the bluish dusky look of many discs, at first glance like an old atrophy. Investigators had asserted that it was due to hemorrhage into the tunic about the nerve. He had watched this duskiness disappear. That

would suggest that it was due to congestion.

C. W. TOOKER,
Editor.

NASHVILLE ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

December 19, 1927

DR. J. LESLIE BRYAN presiding

Cavernous sinus thrombosis

DR. W. W. WILKERSON saw M. T., white, female, aged twelve years, who complained of marked swelling and pain of the right eye and lids of two days duration. Two days before he was called, a small yellow superficial abscess was noted just below the inner canthus of her right eye. This gave her no pain but was picked with a needle and the contents expressed. The following morning the patient noticed that her right eyeball was more prominent than her left and that the lids were slightly swollen. At this time the patient was complaining of some headache, pain in the region of her right eye, and some drowsiness. The swelling gradually became more marked, extending down the right side of her face, and her headaches became more severe. The following morning there was marked swelling of the upper and lower right eyelids, proptosis of the eyeball, and inability to move the right eye in any direction. The right pupil was dilated and immobile, while the left was negative. The swelling also extended down to the neck. The temperature at this time was 104 degrees, the pulse 120. Though the patient was drowsy, she was rational and able to answer any questions. No bruit was heard in the region of her eye.

She was sent to the hospital, and on arrival her sinuses were x-rayed. They were found to be normal. By this time she had become semiconscious. The general examination revealed no pathology other than that previously described. The swelling on the right side of her face was merely edema, not being red nor showing any signs of inflammation. On admittance to the hospital her white blood cell count was 12,400, the differential count showed polymorphonuclears 93 per cent, small lymphocytes 4 per cent, and large lymphocytes 3 per cent. The eye grounds showed an enlargement of the veins but no other pathology.

The following day the patient was unconscious, and many small petechial hemorrhages were scattered over her body. The swelling on the right side of the face was more pronounced, and the left side of the face showed practically the same signs as the right side had done on the previous day. At this time a few retinal hemorrhages were found in each eye. The reflexes were not increased. The left arm was stiff and the neck rigid, but no other positive pathological findings were present. She died that night at 9 o'clock.

The white blood count increased from 12,400 on entrance to the hospital to 16,600 in the course of four hours, but on the following day it dropped to 9,600. The differential count in each case showed polymorphonuclears 90 to 95 per cent. Blood cultures on the day of admittance and also the following day were found to be positive. Pure cultures of staphylococcus aureus were found in each instance. The temperature ran a septic course varying from 105 degrees to 102 degrees. The pulse rate varied from 120 on admittance to 180 at death and was always very weak. Other than general care no treatment was instituted.

Toti-Mosher operation

DR. W. G. KENNON presented the case of F. H. A., colored male, ten years of age, who gave a history of a purulent dacryocystitis of nine years duration. He had had considerable epiphora and intermittent conjunctival injection. There had been no surgical interference.

Examination showed the right lacrymal sac filled with a purulent material. After several weeks of observation and local treatment, there was no improvement.

A Toti-Mosher operation was done, excising the medial half of the sac and transplanting the lateral half inside the nose. Three weeks later there was still

some epiphora present, and mucoid material was expressible from the lacrymal sac. The patient was not seen again for nine months. At this time he was completely free of epiphora, and no pus could be expressed from the sac. There had been no return of symptoms in the past two months.

Fracture of orbital margin with upward displacement of eye

Dr. Herschel Ezell presented the case of Mr. E. G. M., who was seen November 25, 1927, with marked inflammation of the left eye and surrounding tissues due, he stated, to falling against the running board of his automobile the previous afternoon.

Examination showed vision of both eyes 20/20, although the left eyelids were so badly swollen that he could not open them. There was a depression of the lower and outer margin of the orbital cavity and the left eye was displaced upward fully three-quarters of an inch. The bridge of the nose was fractured and pushed slightly towards the right side, and the nasal septum was deflected towards the left. Anesthesia was present on the left side of the nose, the lip, and a part of the face.

Transillumination showed cloudiness in the region of the left antrum and eye, but a clear condition on the opposite side.

Treatment prescribed was rest of the eyes, cold compresses, and dark glasses. Five weeks later the swelling had about subsided, and one could see and determine by palpation the extent of the fracture much better than was possible when the patient was first seen. On December 15, the field of the left eye was normal. The vision had remained normal. On December 16, roentgenograms of the injured parts revealed the fracture.

Since the subsidence of the inflammation the left eye had fallen somewhat, but it was still displaced upward perhaps one-half inch. The anesthesia was still present and according to the patient had changed little if any. Dr. Ezell had been of opinion from the first that an operation for replacement of the fractured bones was not advisable.

Filtration bleb following Elliot trephine operation

Dr. Hilliard Wood reported the case of C. W. W., white, male, aged forty years, whom he saw in March, 1926. The patient had in the right eye incipient subacute inflammatory glaucoma. The Elliot trephine operation was done, with peripheral iridectomy. Convalescence was uneventful, and the resulting vision, with correction, was 20/20.

The condition remained as above until November 19, 1927, when the patient's baby struck him in the right eye and ruptured the filtration bleb. His physician, Dr. Moorman, immediately bandaged the eye and confined the patient to bed for several days. A week later Dr. Moorman wrote that under bandage and quiet, the rupture in the filtration bleb had entirely healed, the anterior chamber was restored, and vision back to normal.

Herschel L. Ezell,
Secretary.

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THE VITREOUS

A workman, learning to adjust or repair a certain machine, often begins by taking it apart and putting it together again. The putting together is the more important; the taking apart is only preparatory. We study anatomy by a similar method; dissecting is preparatory. Too often we go no further. Anatomy is sometimes thought of merely as applied to operative surgery; a kind of taking apart of the body. Our knowledge of the anatomy of the vitreous has rested too much on this kind of study; and has been uncertain and of no great practical value.

A better knowledge of the vitreous is to be gained by systematic study of its development. Ida Mann, in her paper on "the nature and boundaries of the vitreous humor" (Transactions of the Ophthalmological Society of the United Kingdom, 1927), reports such a study, supplemented by numerous observations by biomicroscopy of the vitreous. The observations as to the structure and origin of the vitreous, hitherto confusing and contradictory, are reconciled and united by tracing its development with that of neighboring parts. The disposition to think of the body as dissected, rather than of its parts in their normal relations during life, is corrected by studying those relations during development.

In the embryo before the fifth week, the retinal ectoderm is in contact with that of the lens plate. They become separated by fibrils that grow out from the cells of both layers. Into this primary vitreous comes undifferentiated mesodermal tissue, to form the hyaloid vessels. The part of this primary vitreous next to the lens condenses into a loose fibrous envelope, the perilenticular capsule. Within this capsule there can be no further development of the vitreous after the lens epithelium has been shut off by its hyaline membrane, the lens capsule. But the vitreous back of the perilenticular capsule continues to grow by fibrils from the retinal ectoderm. This is not interfered with by the "internal limiting membrane" of the retina, which consists of the foot plates of the fibers of Mueller and, unlike the lens capsule, can be considered cellular.

This part of the vitreous, outside the perilenticular capsule, is called the secondary vitreous. It constitutes the greater part of the vitreous humor. But through it from the optic disc to the lens runs a conical space, with its base at the lens and its apex at the disc, marked off by a condensation of tissue. This is the "canal of Cloquet", the contents of which, including the hyaloid artery or its remains, may be considered part of the primary vitreous.

About the periphery of the crystalline lens, there is no decided separation between the primary and the secondary vitreous. In this region there are developed short, stout fibrils, arranged in bundles that cross each other at right angles, and which become the suspensory ligament or zonule of the lens. This part has been called the isthmic fasciculus, and may be considered the "tertiary vitreous". By the sixth month the primary vitreous has become a loose mesh, containing the atrophic vessels of the vascular capsule of the lens, prolonged backward along the main trunk of the hyaloid artery. The secondary vitreous is now quite avascular, and the tertiary has become the zonule. At birth the vitreous has grown clear, is optically more empty than it is in later life.

The fully developed vitreous is a colloidal "jel"—a continuous mesh of fibers, closer in some places than others —a fibrillar scaffold permeated by jelly. The fibers are loose enough to permit free movement, yet definitely limit its range. After birth the walls of the canal of Cloquet and the surrounding fibrils relax, and permit the walls and what they contain to sag down, so that the upper wall may be seen through the pupil as the "hyaloid membrane"; there being no hyaloid membrane other than this. With dilated pupil and in favorable eyes this may be studied with the biomicroscope. The microscope and the narrow beam of light should be adjusted on to the face of the vitreous. Then the patient should look down and quickly look back at the point he previously fixed. The so-called "hyaloid membrane", the upper wall of Cloquet's canal, is seen to have risen showing the canal. Then gradually it settles down again, the whole process taking ten or fifteen seconds. "To obtain a knowledge of the vitreous clinically it is always necessary to examine it in motion."

Movement in the vitreous, whether of shadows of opacities noticed by the patient, or of the opacities seen with the ophthalmoscope, has always been an important symptom of vitreous conditions. It may be hoped that, with a better understanding of actual structure and normal conditions, examinations in the living eye will furnish a basis for much more exact and general appreciation of the practical significance of changes in the vitreous.

E. J.

EYE PHYSICIAN OR EYE SURGEON—CUI BONO?

Labels and tags serve for identification. There seems to be in the atmosphere a suggestion that the physician or surgeon whose practice is limited to ocular disorders has not acquired a sufficiently unequivocal label or tag. In this country he has long possessed two honorable titles, "oculist" and "ophthalmologist". But it appears that the general public, who depend upon the oculist or ophthalmologist for care of their eyes, and upon whom in turn the oculist or ophthalmologist depends for his living, have not been educated in Latin or Greek roots to a degree that will avoid confusion of these titles with such terms as "optician" or "optometrist".

In September of last year Dr. Edward Jackson (this Journal, volume 10, page 705) and in the February issue of this year Dr. Lawrence T. Post (volume 11, page 150) commented with approval on a proposal by the Guild of Dispensing Opticians to apply to the physician who limits his practice to the eye the title "eye physician". In a letter published in the March issue (page 244) Dr. W. H. Wilder gently took exception to this proposal as hardly in conformity with the fact that ophthalmology is a surgical specialty not only as regards many delicate op-

erative procedures which it employs but even in the measurement of refractive errors with a view to their correction by glasses.

In Great Britain the title "ophthalmic surgeon" appears to have been well established. It may be that in this country the time is ripe for general discussion as to the most satisfactory title, and in the event of any such discussion may it not be logical to adopt the title already employed by our cousins overseas?

Whichever title is preferred, it may not be amiss to inquire who is harmed by the existing confusion, who would profit by a standardization of title, and how far any title selected can be successfully incorporated in the vocabulary of the general public. So far as any confusion exists in the minds of educated laymen, it is they on the one hand and the ophthalmic surgeon on the other hand who at times suffer disadvantage, and it is the less conscientious type of optician who reaps a temporary reward. If a new title were clearly defined and broadly established among opticians, the laity, and the medical profession, the result would accrue alike to the advantage of the general public and of the ophthalmic surgeon. But who is to establish clearly in the public mind the fact that we are no longer to be mentioned as oculists or ophthalmogists, but as eye physicians, eye surgeons, or ophthalmic surgeons as the case may be?

Shall we, through our national, state, or city organizations, advertise the fact in the public press? Shall we trust to the ethical optician to accomplish this result, or shall we conduct an educational campaign among those who visit our offices and who in principle are therefore already sophisticated? And when the inward significance of the new title has been adequately broadcast, how shall the label or tag be applied to the individual ophthalmologist? Where may he publish the title?

There might be excellent arguments in favor of the educational and humanitarian benefits to be derived from some such announcement, if it were based upon a satisfactory national standard of education and licensure with which the announcement was legally required to coincide, but under present conditions can any such title be offered to the public with the assurance that it guarantees what it implies, namely adequate training and qualification for special services in medicine or surgery?

It must not be forgotten that the oldest ophthalmological organization in this country still requires that none of its members "shall attach or suffer to be attached to his name, in any public manner, the title of 'oculist' or any similar title, or shall make public announcement by a sign of a specialty with which he is identified, or shall announce in print that he gives special or exclusive attention to special practice, save only as this affects the directory of the American Medical Association or similar professional directories."

It may be convenient to adopt for use among ourselves and in common parlance among the medical profession the title "ophthalmic surgeon", "eye physician", or "eye surgeon"; but whether the public or the oculist will reap any substantial advantage therefrom is open to question.

W. H. C.

EXPLANATIONS ON PRESCRIBING GLASSES

It is interesting to study a curve showing the rate of memory loss. From the 100 per cent of the moment of the event it drops precipitously so that on an average scarcely 10 per cent of the total is retained after twenty-four hours are past. The curve then flattens and through the year gradually approaches the base line. It is therefore not remarkable that our instructions and explanations to patients are rapidly forgotten and are blended with other memories to distort our intended meaning.

So frequently does the returning patient startle us by declaring that we told him something contrary to the advice we are sure we must have given, and so often do patients who have consulted other oculists quote them as say-

ing things which we know were certainly not intended, that the older we grow the less do we offer explanations to patients about their condition.

However, there seem to be certain things which should be told the patient who has been given glasses to relieve eyestrain. Frequently, though the proper correction was prescribed, attention was inadequately called to certain disagreeable features which the patient would notice and which, lacking understanding, caused these correct glasses to be discarded and advice sought elsewhere. The astute business man had then seized his opportunity and, knowing the cause of the objections voiced by the patient, had catered to his desires and prescribed glasses which would be temporarily more pleasing but in the long run harmful.

Perhaps the most important explanation that is not sufficiently stressed is that for the hypermetropic person the correct glass will blur the sight somewhat for distance unless the glasses are worn constantly. It is true, though, that often too strong a glass is prescribed because of failure to realize that the twenty foot range does not correspond to distant vision and that ability to read twenty-fifteenths is not the same as perfect vision at a hundred feet or more, but that to attain this an appreciable percentage deduction from the plus strength of the lenses must be made.

Another common complaint is that, after wearing the glasses for a while, everything was blurred when they were taken off and that, whereas the patient was able to read without glasses before lenses were prescribed, he was afterward unable to do so, his not unnatural conclusion being that the glasses had weakened his eyes.

When strong convex lenses are prescribed it is well to explain that they will permit relaxation and with relaxation will come comfort, but that this very relaxation will reduce the willingness of the eyes to read without glasses; an unattractive but inevitable concomitant of comfort.

This is especially true of those who are just becoming presbyopic and have never previously worn glasses. It is well to make it clear to such patients that though glasses are necessary to relieve the eyestrain it is true that reading ability without glasses may be lost sooner if lenses are worn than if they struggle on without such help, but that it is only a matter of a short time at best before glasses will be a necessity and that much harm may be done by straining the eyes in the meantime.

To retain the muscle power as long as possible in hypermetropia, some ophthalmologists may feel that discrete use of the eyes without glasses, well within the limit of comfort, is permissible in selected cases; but for patients with a considerable error nothing short of constant wearing of glasses will suffice.

L. T. P.

WHO SHALL ATTEND SIGHT-SAVING CLASSES?

In every department of education, no two civilized countries develop along exactly the same lines. Each lays emphasis upon principles and methods which have less weight elsewhere, sometimes because of special needs, but more frequently because variation plays fully as important a part in the evolution of the mind as of the body, and manifests itself not only in individuals but in nations.

Although special schools for those with weak vision were demanded as far back as 1802 by a Viennese of the name of Gaheis, it was not until over a hundred years later that the first school of this character was established out of public funds. This was in London, England, in 1905, largely as the result of the labors of the ophthalmic surgeon N. Bishop Harman. This first "myopic school" began with twenty pupils, fourteen myopes and six with other visual disturbances. The London classes are now attended by over two thousand pupils, and according to Kerr the number ought to be ten times greater. The first American sight-saving class came in Cleveland in 1911.

An able address by Bartels before the ophthalmologists of Rhine Province and Westphalia surveys the development of "sight-saving classes" particularly in England, the United States, and Germany*. The author devotes particular attention to the question of which children should attend these special classes.

Germany was at first slow to move in the creation of special schools for those who were neither fitted for instruction in the ordinary public schools nor suitable inmates for blind institutions. Levinsohn had first called for such action in 1907, but it was not until 1919 that a special school was established in Berlin. Development has been rapid, so that there are now two Berlin schools of eight classes each, employing the most advanced methods of instruction. Other German cities have rapidly followed the same lead, and today a good deal of effort is being applied to the training of those who are to teach in sight-saving schools.

There is great variation in local custom as to the standards by which children are admitted to "myopic", "sight-saving", or "weak vision" schools (even the three titles representing a striking difference of basic nomenclature in England, the United States, and Germany). Berlin regards as eligible all children with visual acuity of less than one third. Bartels, who has seen intelligent children with visual acuity of one fiftieth and retinitis pigmentosa who under careful supervision were able to maintain good progress in school and to read and write in larger script, suggests, however, that, for those whose defects are stationary, the range of vision should ordinarily lie between two fiftieths and one fourth, with a few exceptions up to one third and down to one fiftieth.

Those whose vision is endangered by active, progressive, or recurring ocular disorders may have to be accepted either temporarily or permanently according to visual acuity and other circumstances. Most cases of high refractive error are to be considered purely according to their range of vision. Those who have myopia of more than eight diopters at the time of commencing school life should be included, but need to attend the special classes only for departments of study that particularly tax their visual acuity.

Bartels does not agree with those who would place in the sight-saving class children who suffer from asthenopia but have good visual acuity; they should be subjected to medical or neurological treatment.

Kerr has expressed himself to the effect that the state would acquire more valuable citizens through its sight-saving classes than by the care of cripples and the tuberculous. There is need for broad national consideration of the whole problem, and Bartels suggests that it should be the subject of international discussion.

In every large city those who need this special care should be sought out by cooperation between the school principal and teachers, the school physician, and the ophthalmologist.

W. H. C.

* Klinische Monatsblätter für Augenheilkunde, 1927, volume 79, page 796.

MEETINGS FOR THIS YEAR

There are certain annual meetings in which ophthalmologists are especially interested. Those who are travelling could often make their plans more definite and add much to the interest of a tour, by including in their itinerary the dates of one or more of these gatherings of colleagues in their profession. For 1928 the following dates and places of meeting are of interest:

April 19, 20, and 21 the Ophthalmological Society of the United Kingdom will meet in the hall of the Royal Society of Medicine in London, England. The Pacific Coast Oto-Ophthalmological Society meets this year at Santa Barbara, California, on April 18, 19, and 20. On April 30 and May 1 and 2, the American Ophthalmological Society will meet in Washington, D.C., in connection with the Triennial Congress of American Physicians and Surgeons. The rigid requirements of this Society as to membership may have

given a false impression of the cordial welcome extended to all members of the regular medical profession interested in ophthalmology who attend its meetings.

In May the Société Française d'Ophtalmologie meets in Paris. The dates for this year are not at hand; but they generally fall in the second week of the month. The meeting should attract all who read and understand French.

June 12 to 15 inclusive, the American Medical Association meets in Minneapolis; the first meeting of the Section on Ophthalmology being held the morning of Wednesday the 13th. Each year this great gathering of the medical profession brings together more who are interested in ophthalmology than assemble at any other of the annual meetings of ophthalmologists.

In July the Oxford Congress, with its visitors from other countries of Europe and from America, assembles at Oxford, England. Its sessions are commonly held about the second week of the month, although exact dates for 1928 are not yet announced. The Colorado Congress will meet at Denver on July 20th and 21st.

The meeting of the American Academy of Ophthalmology and Oto-Laryngology will be held this year in Saint Louis, October 15 to 19 inclusive. The annual gatherings of this active organization have in recent years attained an important place, both on account of its papers and discussions, and because of its successful effort to bring together courses of graduate instruction of high grade in the special branches of medicine that its members cultivate. *E. J.*

BOOK NOTICES

Transactions of the Ophthalmological Society of the United Kingdom, vol. 47. Cloth, octavo, 517 pages, 3 plates, 82 illustrations. London, J. and A. Churchill, 1927.

As usual with these transactions, the volume includes papers and discussions before the "affiliated societies." These are the Oxford Congress, the Irish Ophthalmological Society, the Scottish Ophthalmic Club, and the Midland, North of England, and Southwestern Ophthalmological Societies. The first 52 pages are taken up with lists, rules and information about the activities of the Society. The proceedings of the annual congress occupy 223 pages, the Oxford Congress 151 pages, the Midland, North of England, and Irish Societies have together 74 pages, and an index of 13 pages completes the volume.

The "discussion" on nystagmus (excepting miners') with its four opening papers, which begins the scientific proceedings of the annual congress, might well be called a symposium; and this is even more true of the "discussion" on the etiology and treatment of hypopyon ulcer, in which there were nine opening papers. Another discussion of especial value was introduced by a paper from Frank Juler on sarcoma of the lid cured by radium. Mr. Treacher Collins' paper on metaplasia of the tissues of the eyeball is philosophical and complete. The paper of Miss Ida C. Mann on the nature and boundaries of the vitreous humor has been abstracted in the editorial on the vitreous humor; but the whole text and the illustrations, based on microscopic sections and slit-lamp studies, are so valuable, that the abstract cannot convey the full scope of the paper.

At the Oxford Congress "the results of the operative treatment of glaucoma" were the subject of a discussion opened by a paper from Dr. W. H. Wilmer of Baltimore, and participated in by a dozen others who came from points as far removed as India, Chicago, Copenhagen, and Poland. Then followed a paper by Professor Lagrange of Bordeaux on "treatment of glaucoma, its surgical hour; choice of operative procedure"; and one on "results of iridencleisis", by Gjessing of Drammen, Norway. The Doyne Memorial Lecture was given by Professor Lundsgaard on "the pneumococcus in connection with ophthalmology". It is a judicious review of the rather extensive literature of the subject, notable for its recognition of the original work done by Lindner in Vienna and Cheney in Boston. There are papers by Ed-

mund Carsten of Copenhagen on color perception in various illuminations, and by J. Burdon Cooper on canals in the vitreous; and by Margaret Dobson on "insufficiency of accommodation, a factor in causing cataract".

The earlier volumes of these transactions are remarkable for the number and wide variety of clinical cases briefly reported in them. But since the monthly meetings have been replaced by the annual congress, such reports have become the rare exception. However, this valuable feature has not been entirely lost, for the proceedings of the affiliated societies—Midland, North of England, and Irish—are almost wholly occupied by such cases; there being one hundred and three of them in this volume. The practical common sense character of the transactions is well maintained. *E. J.*

Transactions of the Indiana Academy of Ophthalmology and Otolaryngology, tenth annual meeting, December 14 and 15, 1927. Edited by the Secretary-Treasurer, C. W. Rutherford, Indianapolis. Paper, 124 pages.

This carefully prepared and well printed volume of transactions contains, in addition to some reports, twelve papers including the address of the president, B. W. Egan, C. P. Clark's thoroughly studied case of atypical conjunctivitis tularensis (published in this Journal), and a paper by Emory Hill, the guest of honor, on ophthalmologic studies in the diagnosis and localization of brain tumors. An "analysis of the drifting patient" by H. W. Eby, brought out a very amusing discussion of this feature of the practice of medicine. *W. H. C.*

Transactions of the Pacific Coast Otoophthalmological Society, 1927. Paper, octavo, 133 pages, 32 illustrations. Published by the Society, Walter F. Hoffman, M.D., secretary. Seattle, Washington, 1928.

The nine papers on ophthalmology occupy 77 pages in this volume, and some others are partly for the ophthalmologist. Most of the papers are brief and practical, and gave rise to interesting discussions. The following subjects of especial interest were considered in them: sympathetic ophthalmia, carcinoma of the choroid, vision in relation to industry. There were also longer papers on ocular deviations, their diagnosis and treatment, hypophyseal tumors in relation to eye and nose, binocular corneal microscopy, extraction of intraocular foreign bodies (see this Journal, vol. 10, p. 919), choked disc with intracranial lesions, fundus changes in cardiovascular renal disease. The volume is out earlier in the year than was its immediate predecessor, and compares favorably with it. But the small type in which it is printed prevents it from being imposing in appearance. *E. J.*

Practical Medicine: Eye, Ear, Nose, and Throat, edited by Charles P. Small, Albert H. Andrews, and George E. Shambaugh. Series 1927. Chicago, the Year Book Publishers.

This annual volume of 526 pages, including a careful index, selects some of the essays showing value in the study of the eye, ear, nose, and throat during the previous year; the selections usually being appropriate.

Abstracts on the eye occupy 204 pages. Hereditary anomalies were discussed by Madge Winslow MacKlin. Burch is given an exhaustive abstract of his paper on ophthalmoscopic evidence of general circulatory disease ("Practically all visible retinal pathology results from causes which manifest themselves through vascular changes") which is accompanied by two good colored illustrations. Periodical eye examinations were recommended by W. Holbrook Lowell and Ida Mann. Slitlamp microscopy and photography of the fundus come in for comment from Harrison Butler, Von der Heydt, and Boyce.

The psychologic aspect of refraction was discussed by J. F. Edwards, and refraction changes by Ellett.

We find quoted some dangerous advice offered by Lewis Weiss, and that

is the treatment of ophthalmia neonatorum by instillation of four per cent cocaine solution once a day for seven days for prophylaxis; and for treatment the same cocaine solution every two hours or oftener, with no use of the silver compounds, iced compresses, or anything else except wiping away the discharge. It is to be regretted that this article (of which the editor expresses his decided disapproval) was ever published, and the inclusion of such rank heresy and folly in the pages of a book devoted to the advance of medical science is in the reviewer's opinion a crass error. For some misguided novice in our art may follow the advice of the author, and not only blind the eyes of the babies but subject himself to the accusation of malpractice, and the profession to disrepute. Does not the author know that cocaine cuts off the canal nutrition and that there is great danger in such ophthalmias? Has he had so little experience that he has never seen exfoliation of the corneal epithelium from the operative use of cocaine? Does any reliable practitioner give cocaine drops into the hands of the patient?

Other papers quoted are by Khanka on intracapsular extraction without iridectomy, Fisher on his modification of the Smith operation, McReynolds on glaucoma and Lane, and also Franklin and Cordes, on radium therapy. There are other eye articles worthy of notice.

H. V. W.

American College of Surgeons, fifteenth year book, 1928. Cloth, octavo, 868 pages. Published by the College.

This volume, which goes out to all the Fellows of the College, is of value as a directory of the thousands of Fellows who are engaged in surgical practice and the surgical specialties, including ophthalmology and otolaryngology. The geographical list of Fellows includes 945 who are engaged partly or exclusively in ophthalmic practice. Some are given from each of the United States as well as from Canada, Cuba, Central America, Colombia, Brazil, Chile, Peru, Panama, Venezuela, and other parts of the world. Only less important is the list of hospitals in the United States that have accepted and carried out the conditions promulgated by the College for hospital standardization. There is also much information of interest regarding activities of the College, and the lists of its officers.

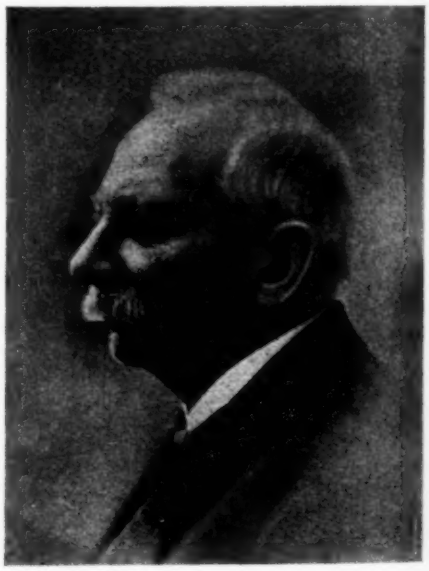
E. J.

OBITUARY

Hjalmar Schiötz

(Summarized from an obituary by Professor Hagen, Oslo, in the Klinische Monatsblätter für Augenheilkunde.)

Professor Hjalmar Schiötz, inventor of the tonometer, and joint inventor with Javal of the Javal-Schiötz ophthalmometer, died in Oslo, Norway, on December 8, 1927. He was almost seventy-eight years old, and had been actively at work when stricken with apoplexy a few days before his death. His whole life had been devoted to the solution of ophthalmologic problems. His tonometer was demonstrated for the first time in the Norwegian Medical Society in May, 1905, after the inventor had worked on it for three years. The Javal-Schiötz



Professor Hjalmar Schiötz, died December 8, 1927

ophthalmometer, upon the invention of which he labored with Javal at the laboratory in the Sorbonne, was first exhibited at the Milan congress in 1880. Dr. Holth's memorial address in the Norwegian Medical Society speaks as follows of Schiötz's part in this invention:

"For a long time this clever instrument carried as a rule only the name of Javal; in France it was called "the Javal," and in Germany the "Javal ophthalmometer," this name being employed by Professor Siegrist in 1904 at the Tenth International Congress of Ophthalmology in Luzern, in demonstrating a good model of the instrument from a firm in Bern. Javal at once took the floor and began: 'They have not done justice to my collaborator, Dr. Schiötz, who played a very important rôle in our work. The instrument should always be called the ophthalmometer of Javal and Schiötz.'"

On returning from Paris in 1881, Schiötz became assistant in the surgical department of the Royal Hospital in Christiania (now Oslo). He introduced asepsis in Norway at a time when the aseptic procedure was unknown in other locations, substituting heat for antiseptics in the sterilization of instruments.

Schiötz became professor in 1901. Among other appliances, he designed a self-registering perimeter. He retired from the professorship in 1922, and since that time had constructed a new model of his tonometer and had revised its calibration curve.

ABSTRACT DEPARTMENT

Abstracts will be classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases, including parasites
18. Hygiene, sociology, education and history

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1. GENERAL METHODS OF DIAGNOSIS

Vonwiller, Paul. **The microscopical examination of the living eye with high magnification.** Zeit. f. Augenh., 1927, v. 36, Dec., p. 362.

The author has had a large mechanical stage constructed to which he straps a rabbit to examine the eye with the corneal microscope. He illuminates by means of a slit-lamp with a special joint that permits inclination. For very high magnification the animal is narcotized, and a cover glass is pressed on the cornea or conjunctiva and held by means of an adjustable clamp. The author illuminates by means of an opaque illuminator with an improved lamp, so that it is possible to get a very satisfactory view even with oil immersion objectives.

F. H. Haessler.

2. THERAPEUTICS AND OPERATIONS

Gutmann, Adolf. **Focal blue light lamp for radiation of the eye.** Klin. M. f. Augenh., 1927, v. 79, Dec., p. 788.

The lamp is described in detail with illustration. *C. Zimmermann.*

Lawson, Arnold. **The value of antiseptics in modern ophthalmic surgery.** Brit. Med. Jour., 1927, Dec. 17, p. 1128.

Considers the subject from four points of view: contamination from the conjunctiva; contamination from instruments and dressings; contamination from the fingers of surgeon and assistant; and contamination from the lash area. His statement that the normal conjunctival sac is in itself antiseptic and requires no treatment prior to operation is worthy of note. He does not advocate neglect of precautionary measures before operation, but emphasizes that the routine use of antiseptics in the conjunctival sac arises from a faulty appreciation of the facts. To determine the presence or absence of discharge in an eye to be operated on, simply tying up the eye for a few hours with an aseptic pad is sufficient.

D. H. O'Rourke.

Lewis, Park. **Testing the sight of the young child.** Hygeia, 1927, Nov., p. 575.

This is an article written for the layman concerning the testing of vision of very young or preschool children. The reviewer has seen a demonstration of the method suggested, and the results were admirable. The illiterate E test card is used in a unique and accurate manner.

D. H. O'Rourke.

Meesmann, A., and Reichling, W. **Treatment of tuberculous eye affections with a new tuberculin** (Ertuban Schilling). Klin. M. f. Augenh., 1927, v. 79, Nov., p. 629.

Ertuban, manufactured by E. Schering, Berlin, is an aqueous extract of living tubercle bacilli of the typus humanus, filtered. It contains metabolic products of living and the substances of dead bacilli, and in subcutaneous injection of tuberculous guinea pigs corresponds to old tuberculin forty times diluted. Its lessened toxicity and lack of general disturbances render it especially adaptable for ophthalmological purposes. The cases are arranged in tabular form and show satisfactory final results in fifteen. Its therapeutic value in iridocyclitis or affections of the fundus in the secondary stage has not been sufficiently tested.

C. Zimmermann.

Peters, H. **Detachment of Descemet's membrane by operations opening the eyeball.** Klin. M. f. Augenh., 1928, v. 80, Jan., p. 87.

Two cases of glaucoma in women aged eighty-six and eighty-seven years respectively are reported in which after cyclodialysis and iridectomy a portion of Descemet's membrane was detached in the shape of a rolled up piece clear as glass.

C. Zimmermann.

Pflugk, A. **Is radiation therapy with ultraviolet light to be recommended for the practising ophthalmologist?** Klin. M. f. Augenh., 1927, v. 79, Dec., p. 790.

Pflugk answers this question in the affirmative. He enumerates his good results with Birch-Hirschfeld's lamp in various eye diseases.

C. Zimmermann.

Poos, F. **Action of ergotamin on the eye.** Klin. M. f. Augenh., 1927, v. 79, Nov., p. 577. (2 curves).

Instillation of ergotamin into the eye of the cat has an action like physostigmin, whereas in the eye of the rabbit it produces excitation of the sympathetic like adrenalin. In the human eye it acts similarly as in the rabbit. Undoubtedly, it does not paralyze the sympathetic.

C. Zimmermann.

Rothlin, E. **On the specificity of ergotamin.** Klin. M. f. Augenh., 1928, v. 80, Jan., p. 42.

Rothlin's experiments show that ergotamin has a selective action in stimulating and checking the sympathetic nerve fibers.

C. Zimmermann.

Zamkovsky, I. **Experimental investigations of the action of subconjunctival injections of dionin upon a normal eye.** Archiv Oftalmologii (Russian), 1927, v. 3, pt. 3, p. 488.

As compared with the use of dionin in eyedrops or with subconjunctival injections of a five per cent solution of sodium chloride, subconjunctival injections of dionin produce experimentally an increased and more durable passage of albumen into the aqueous humor. This is due to a greater permeability of the uveal blood vessels after subconjunctival injections of dionin, which in the author's experience proved to be of higher therapeutic value than the instillation of dionin drops.

M. Beigelman.

3. PHYSIOLOGIC OPTICS, REFRACTION, AND COLOR VISION

Bard, L. **The rôle of the "local index" in the localization of visual images, and its application to the problem of the blind spot.** Arch. d'Opht., 1928, v. 45, Jan., p. 5.

A defense of the theory that the entire ability to appreciate depth, distance and direction resides in the cells of the retina itself against the criticism of it by Hartmann is given. The direction of the axis of the cones is fixed, and light rays falling upon them have their direction determined in relation to the axis of the cones. The fact that there is not a separate fiber in the optic tract from each cone to the cortex makes it necessary that the appreciation of depth, distance, and direction be determined in the retina before the message is sent to the cortex. As the retina has depth it is possible that the third dimension is appreciated in the depth of the image in the retina itself. Distance can be computed by the angle

of incidence of the ray upon the retina. The blind spot is not perceived because the axes of the cones surrounding it converge toward its center. This is shown in fresh anatomical preparations and experimentally by the distortion of the image of an object which lies half within and half without the blind spot. The writer is convinced that convergence and psychological phenomena are not necessary to explain the faculties of appreciation of depth, distance, and direction.

M. F. Weymann.

Essed, W. F. R., and Soewarno, M. **Experimental myopia in monkeys.** Klin. M. f. Augenh., 1928, v. 80, Jan., p. 56. (2 ill. 1 table.)

The first few experiments according to Levinsohn's method were negative, because the animals were too old. The monkeys, from six months to one and a half years of age, were placed in the boxes with their faces in horizontal position and with an arrangement by which they were prevented from looking up. In five of the seven the original hypermetropia turned into myopia. Thus the experiments confirmed in every respect the theory of Levinsohn, who ascribes the etiology of myopia to gravitation.

C. Zimmermann.

Maggiore, Luigi. **Vision through inclined lenses.** Ann. di Ottal., 1927, v. 55, Jan.-Feb., p. 140.

In this article, which does not lend itself to abstracting, the author takes up the reasons why more distinct vision is sometimes obtained through inclined lenses. He explains the optical phenomena involved in vision through inclined prisms, spheres, and cylinders, and suggests ways of making use of these principles in prescribing lenses, especially for myopes and aphakic patients.

S. R. Gifford.

Marshall, Wilfred. **Color vision after intravenous injection of santonin.** Jour. Phar. and Exper. Ther., 1928, v. 32, Jan., p. 189.

This is an experimental study of certain phases of color vision after injection into the median basilic vein of ten mg. of santonin in ten c. c. of physiologic saline solution containing ten per cent alcohol to insure solution. A second experiment of a similar nature was made with the eyes dark adapted. The effects of santonin by mouth on color vision are correlated with the experiments dealt with in this paper. The color phenomena experienced by the subject and the visual findings are tabulated.

D. H. O'Rourke.

Trantas. **Velonoskiascopy as I now practise it.** Zeit. f. Augenh., 1927, v. 36, Dec., p. 343.

Velonoskiascopy is as important a subjective method of measuring the refractive error as skiascopy is an objective one. While the latter is more rapid, the former is much more accurate. The author describes his method in detail. The article is rather long, but nothing can well be abbreviated, consequently it does not lend itself to abstracting. Whoever wishes to try the method must read the description in the original. Velonoskiascopy is not expected to replace skiascopy, particularly skiascopy with cylinders, but used after objective skiascopy it frequently adds refinement to the measurement. (See also paper by Lindner, Zeit. f. Augenh., 1926, v. 60, p. 346.)

F. H. Haessler.

Tscherning, M., and Larsen, Harald. **Color vision and its anomalies.** Acta Ophth., v. 4, no. 4, p. 289.

This elaborate piece of laboratory work by Tscherning and Larsen serves to overcome most of the objections to Thomas Young's theory of color vision. If one imagines a sense organ as composed of a central organ and a terminal organ joined together by a connecting thread, the theory is more readily understood. In general, it is the central organ which enables one to see the color in question and which determines the intensity at which one sees the color. The terminal organ determines the relative intensity with which the different radiations act and, consequently, the shape of the color curves

and the limits of the visible spectrum. If the abnormal see the spectrum displaced or elongated, this is due to their terminal organs being different from those of normal persons. The article contains a great number of curves, tables, and colored plates and formulæ of value to those interested in the laboratory problems of color vision.

E. M. Blake.

4. OCULAR MOVEMENTS

Favil, John. **The twenty-six normally possible forms of rotationally induced nystagmus.** Arch. of Neur. and Psych., 1928, v. 19, Feb., p. 318.

In addition to the fourteen recognized types of nystagmus that can be induced by rotation, the author predicted after the necessary calculations of position and rotation, twelve theoretically possible additional types of nystagmus. Then, using a patient in whom he had produced normally all the fourteen recognized types of nystagmus, he tested him in each of twelve new positions as previously calculated and in all twenty-four tests the nystagmus was exactly as predicted. The writer believes that his experiments strengthen the theory that there is some endolymph movement in definite relation to the plane of rotation.

D. H. O'Rourke.

Ohm, J. **Objective proof of central visual disturbances by means of optical rotary nystagmus and nystagmography.** (7 ill.) Klin. M. f. Augenh., 1927, v. 79, Dec., p. 750.

Ohm's investigations, which are described in detail, show that the optical turning test with nystagmography enables us, in certain cases of diseases of the macula and retrobulbar neuritis which gives no objective symptoms, to prove the visual disturbance objectively.

C. Zimmermann.

Schöpfer, Otto. **Paralysis of the abducens in the course of herpes zoster ophthalmicus.** Klin. M. f. Augenh., 1928, v. 80, Jan., p. 78.

A man aged sixty-six years developed five days after the outbreak of herpes zoster ophthalmicus paralysis of the homolateral abducens. The close anatomical relations of the abducens to the fifth nerve in the cavernous sinus and the superior orbital fissure are considered as conditions for the propagation of the neuritic process from the fifth nerve.

C. Zimmermann.

Stein, Richard. **Thrombophlebitis of the opposite orbit and crossed paresis of the abducens in otitis media, with statistics on eye symptoms in otitis media and its complications.** Klin. M. f. Augenh., 1928, v. 80, Jan., p. 22. (1 ill., 1 table.)

After radical operation of an acutely exacerbated chronic left otitis media, a septic thrombophlebitis of the cerebral sinuses developed, at first appearing as orbital cellulitis of the right side. Apparently the thrombophlebitis wandered from the left sigmoid sinus through the left cavernous sinus and the circular sinus to the right cavernous sinus and the orbital veins, while at the same time on the left side the thrombosis was limited to the cavernous sinus and caused no symptoms. The patient, a boy of fifteen years, died, and at autopsy both orbits were found to be affected. The paresis of the right abducens was due to pressure in the thrombosed right cavernous sinus.

Out of 795 cases of uncomplicated suppurative otitis media about nine per cent, and out of fifty-five cases of otitic intracranial complications about thirty-five per cent presented fundus changes.

C. Zimmermann.

Taylor, E. W., and McDonald, C. A. **Forced conjugate upward movement of the eyes following epidemic encephalitis.** Arch. of Neur. and Psych., 1928, v. 19, Jan., p. 95.

Analysis of thirteen cases showed that the movements of the eyes in all cases were predominantly upward. In some cases this was combined with a lateral movement. The frequency and duration of the attacks of these movements of the eyes varied widely. Other accompanying eye symptoms were apparently of little significance in relation

to the special phenomenon of deviation. The assumption that the lesion lies in the region of the striatum or in the coordinating mechanism of the ocular nerves has not yet been proved by postmortem examination. The phenomenon has apparently not been observed for more than three years, but from the number of cases cited and others referred to in the bibliography the condition is of relatively frequent occurrence and may be regarded as one of the later manifestations of the parkinsonian syndrome peculiar to postencephalitic cases.

D. H. O'Rourke.

5. CONJUNCTIVA

Carsten, Edmund. **Reactions of normal eyes in patients treated with sanocrysin.** Acta Ophth., 1927, v. 4, no. 3, p. 237.

Thirty-five patients were treated by Edmund Carsten with sanocrysin and the eye reactions studied. Two types of reaction are recognized, a phlyctenular and a palpebral (conjunctivitis), the former occurring in twenty patients, and the latter in ten. The drug seems to free the toxin of the tubercle bacilli and this gives rise to the development of phlyctenules or of a conjunctivitis.

E. M. Blake.

Chan, Y. P., and Oldt, Frank. **The findings in 1,602 eye examinations for trachoma.** China Med. Jour., 1927, v. 41, Dec., p. 992.

Chan and Oldt report on a clinic held during a period of six days, in which time 1,602 Cantonese were examined for trachoma. They feel that too often the incidence rate of trachoma in China has been greatly exaggerated, because folliculosis and follicular conjunctivitis were called trachoma; that the incidence rate of trachoma in Canton is not over fifteen per cent; that trachoma is easily acquired in childhood; and that most good will be done by working on children of school age, as they are more easily reached and controlled in the schools.

D. H. O'Rourke.

Engelking, E. **Morphologic and causal genesis of xanthomatosis bulbi.** Klin. M. f. Augenh., 1927, v. 79, Dec., p. 721. (4 col. pl., 5 ill.)

Eleven cases and experiments on rabbits are described in detail. From his clinical, anatomical, and experimental investigations, Engelking concludes that xanthomatosis bulbi is at least dependent upon two factors: generally deficient supply of fats by the blood current and local lesions of the tissues. These were due to disturbed metabolism in the iris and ciliary body from infections or toxic causes or continued increase of intraocular tension. Generally an increased cholesterin content of the blood could be determined.

C. Zimmermann.

Isakowitz, J. **Argyrosis of the lower lid after probing and injecting four per cent collargol solution into the tear duct.** Klin. M. f. Augenh., 1927, v. 79, Nov., p. 637.

The tear duct of a child aged eight years, affected with purulent dacryocystitis, was treated with probes and injections of collargol. At the seventh injection a hemorrhage with swelling of the lower lid occurred, leaving, after absorption, a bluish-grey discoloration of the whole skin of the lower lid which was still visible after four years.

C. Zimmermann.

Narog, François. **A contribution to the pathology of xerosis of the conjunctiva and cornea and of keratomalacia.** Arch. d'Opht., 1928, v. 45, Jan., p. 25.

Observations on eight patients with xerosis and keratomalacia are presented, together with a review of the literature on these subjects. Studies of these individuals were made with the slit-lamp, and the following conclusions were drawn: First, xerosis of the conjunctiva and keratomalacia are not caused by specific microorganisms, but by avitaminosis which manifests itself by the using up of reserve adipose tissue and by such regressive changes as serous, hyalin, and cornified degeneration and necrosis of the cells. The secretory function of the

epithelium is destroyed, the lacrimal glands atrophy, and their secretion is altered. Second, as a product of disintegration of the cells and destruction of their fixed fats, shining crystals of cholesterin appear in the epithelium, where they are visible with the slit-lamp. Third, conjunctival xerosis not only attacks the angles but in severe cases the entire bulbar conjunctiva. With the latter form there is desquamation en masse of the epithelium. Fourth, the first sign to be manifested due to lack of vitamin A is hemeralopia followed by conjunctival xerosis. Fifth, keratomalacia is most common in the first year of life and may be due to syphilis, tuberculosis, chronic enteritis, the infectious diseases, and disturbances of nutrition which cause lack of vitamin A in the organism. Among adults keratomalacia is rare. It occurs in general ill health, most often as a result of jaundice and affections of the liver caused by exhaustion of the reserves of vitamin A. It is often preceded by hemeralopia and conjunctivitis. Sixth, in avitaminosis of long duration older people are often subject to atypical keratohyaline degeneration of the corneal epithelium. Seventh, in the course of recovery of a process of degeneration in xerosis of the cornea and conjunctiva, the conjunctiva is the first to improve. The serous degeneration disappears, the masses of epithelium desquamate, and after this the crystals become absorbed, the cornea begins to undergo repair, and sensibility returns. The hemeralopia ordinarily stops before disappearance of the conjunctival xerosis, but in severe cases it may disappear last.

M. F. Weymann.

Tschirkovsky, V. **Notes on immunity in trachoma.** Archiv Oftalmologii (Russian), 1927, v. 3, pt. 3, p. 402.

Basing his conclusions on investigations conducted over a period of fourteen years and covering a population of 225,000 in the trachomatous districts of Volga, the author considers "racial" immunity or predisposition to trachoma as rather due to a difference in the social and economic conditions than to any anthropological differences. Neither could he find any proof of "age" immunity—the hypothetic increased resistance to trachomatous infection in adults. He stresses the importance of a lymphatico-hypoplastic constitution as a factor predisposing to trachoma. *M. Beigelman.*

6. CORNEA AND SCLERA

Baumert, O. H. **Keratitis punctata profunda** (Mauthner). Klin. M. f. Augenh., 1927, v. 79, Dec., p. 782.

A man aged twenty-three years who had acquired syphilis two years previously sustained an injury of his left eye by short circuit. Six months later he presented the aspect of keratitis punctata profunda in both eyes, consisting of several punctiform opacities in the deep layers of the cornea, and defects of endothelium and epithelium. Under roentgen radiation new opacities developed. Then he was treated alternately with neosalvarsan and bismuth. The opacities disappeared, and after two months the cornea was clear. So far only two cases have been published, due to congenital lues. The present case confirms the connection between acident and lues, as it is well known in parenchymatous keratitis.

C. Zimmermann.

Blegvad, Olaf. **A case of letter keratitis** (Buchstabenkeratitis). Acta Ophth., 1927, v. 4, no. 3, p. 281.

A thirteen year old boy observed by Blegvad suffered a penetrating wound without iris prolapse, in the right eye. Three months later sympathetic ophthalmia developed and the exciting eye was enucleated. The affected eye ran a severe course for nine months and frequently showed increased tension. Tonometry was performed daily for a long period, and the author suggests that these repeated insults to the corneal epithelium may have caused the unusual opacities in the cornea. The latter lay superficially in the cornea, apparently in the epithelium and the slightly deeper layers. In the periphery were large semilunar opacities, while the center of the cornea showed straight and angular lines, some of

which crossed each other, giving rise to the comparison with letters of the alphabet. *E. M. Blake.*

Casparis, Harton. **Phlyctenular keratoconjunctivitis.** Amer. Jour. Dis. of Children, 1927, v. 34, Nov., p. 779.

The author's conclusions follow: All of the patients reacted to tuberculin intracutaneously, usually showing a minimal amount of tuberculosis elsewhere. Eye symptoms in every instance began to clear up immediately when treatment by desensitization to tuberculin was begun. In some instances exacerbations in eye symptoms occurred during desensitization, apparently in response to an overdose of tuberculin. Tuberculin treatment offers protection against recurrence of attacks for a sufficient length of time to procure through general measures the arrest of the underlying tuberculous focus. The peculiar incidence of phlyctenular keratoconjunctivitis may be explained by assuming that those who develop the disease belong to the group of individuals who are hypersensitive to some "foreign protein". *D. H. O'Rourke.*

Favaloro, Giuseppe. **Ocular aspergillosis: an undescribed form of pseudotuberculous episcleral aspergillosis.** Ann. di Ottal., 1927, v. 55, Jan.-Feb., p. 86.

The author's patient was a peasant seventy years of age, who had noticed for one month a white spot on the bulbar conjunctiva. A small nodule seen at the limbus was removed, followed by use of the cautery. There was no recurrence. Sections showed a mass of segmented, branching threads, with some fruiting bodies characteristic of Aspergillus fumigatus. This mass was surrounded by inflammatory tissue, chiefly large and small mononuclear cells, with some giant cells, and a few areas of necrosis, forming a pseudotuberculous granuloma of the lymphoid type. The origin was probably inoculation through some slight injury to the conjunctiva. Three patients were inoculated subconjunctivally with a stock culture of Aspergillus fumigatus, and one by scarifying the cornea, all with negative results. Subconjunctival inoculation in rabbits produced follicular inflammation. Inoculation of the cornea produced a keratitis of varying severity, some animals developing the picture of ring abscess. Injection into the anterior chamber produced in some animals a severe iridocyclitis, which usually cleared up in eight to ten days. Injection into the choroid produced a severe reaction, with the formation of nodules resembling tubercles, showing necrosis. These were usually formed around the fruiting bodies of the organism which could be seen in sections. The nodules could be differentiated from tuberculosis by their intense vascularity, and the atypical distribution of cells. In many eyes the threads could not be demonstrated, and only positive cultures and animal inoculations from the lesions afforded proof of the nature of the infection. In the literature of ocular aspergillosis five types of infection may be distinguished: (1) keratomycosis, the commonest form; (2) aspergillosis of the vitreous and uveal tract, of which three cases are recorded; (3) panophthalmitis, with one recorded case; (4) conjunctival ulceration, with one case; (5) episcleral pseudotuberculosis, no other case of which seems to be recorded. The rarity of cases of ocular aspergillosis as compared with the ubiquity of the organism depends, according to the author, on various factors, the type of injury, resistance of the individual, difference in virulence of strains of the organism, and difference in resistance of the various ocular tissues. His experiments suggest that the conjunctiva is most resistant to infection, the choroid less so, the cornea and retina least of all. (Bibliography and 12 photomicrographs.)

S. R. Gifford.

Heinonen, O. **Episcleritis periodica fugax and heredity: a further contribution.** Acta Ophth., 1927, v. 4, no. 3, p. 278.

In 1924 Heinonen reported three cases of episcleritis fugax in two generations. He now adds two new cases

in the third generation of the same family, a daughter and a cousin of one of the patients in the second generation. The condition is considered to be a dominant hereditary disease, allied to Quincke's edema and due to a metabolic disturbance.

E. M. Blake.

Krautbauer, G. **Chemical tattooing of the cornea with silver nitrate, gold chloride and platinum chloride.** Klin. M. f. Augenh., 1928, v. 80, Jan., p. 66. (2 ill.)

Krautbauer's experiments on rabbits showed that, upon reduction with hydrazin hydrate, solutions of nitrate of silver produced an invariable color of dark sienna without damage to the tissue. By combination of gold chloride and silver nitrate and reduction by hydrazin hydrate an intense black tattooing with metallic luster was obtained. With hydrazin hydrate finely divided platinum could be deposited from relatively weak solutions of platinum chloride. Hydrazin hydrate has no injurious effect and makes us independent of the reaction and the age of the solutions employed.

C. Zimmermann.

Mulock Houwer, A. **Filamentous keratitis and chronic arthritis.** Klin. M. f. Augenh., 1928, v. 80, Jan., p. 10. (3 ill., 1 table.)

Eleven cases of idiopathic filamentous keratitis of both eyes are described. It commences gradually, has a chronic course, and is incurable. The typical filaments may occur all over the peripheral parts of the cornea, especially below, from a few to over a hundred, with viscid secretion in the conjunctival sac. Generally the condition is found at a fairly advanced age, especially in women. More than half of the patients had arthritis. Its connection with gout was suggested but not proven.

C. Zimmermann.

Narog, François. **A contribution to the pathology of xerosis of the conjunctiva and cornea and of keratomalacia.** Arch. d'Opht., 1928, v. 45, Jan., p. 25.

(See section 5, Conjunctiva.)

Rizzo, Antonio. **The sensitivity of the cornea.** Ann. di Ottal., 1927, v. 55, Jan.-Feb., p. 126.

The author reviews the experimental work of Frey, Nagel, Marx, and others on this subject. Frey had found that the cornea responded to various stimuli only with sensations of pain. Nagel criticized his technique, and believed from his own work that it possessed also sensations of cold and pressure. Rizzo repeated their methods and those of Marx, and concludes that no technique yet worked out is sensitive and reliable enough to furnish definite conclusions on this point.

S. R. Gifford.

Stoewer, P. **Formation of vesicles and cysts in and on the cornea.** Klin. M. f. Augenh., 1927, v. 79, Dec., p. 779.

After extraction of senile cataract a woman developed keratitis bullosa and total sclerosis of the left cornea. After several months a central cyst formed on the right cornea. The anterior wall was removed and the wound touched with tincture of iodin. Microscopically the tissue consisted of normal corneal epithelium covering a membrane of a structure similar to the lamellæ of the cornea.

C. Zimmermann.

Szily, A. **Operation for keratoconus.** Klin. M. f. Augenh., 1928, v. 80, Jan., p. 36. (1 ill., 1 table.)

Von Szily had very satisfactory results from superficial cauterization of the apex of the cones with the dull galvanocautery in an area of about three millimeters, repeated two or three times at intervals of from eight to ten days. After final cicatrization a small iridectomy is performed at the optically best site, followed after a short time by tattooing with gold chloride.

As an example of the connection between traumatism and parenchymatous keratitis, a girl, suffering since her earliest childhood from congenital luetic parenchymatous keratitis with keratoconus, which had healed with a perfectly clear cornea, had a relapse of the keratitis after each cauterization.

C. Zimmermann.

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(See section 5, Conjunctiva.)

Rizzo, Antonio. **The sensitivity of the cornea.** Ann. di Ottal., 1927, v. 55, Jan.-Feb., p. 126.

The author reviews the experimental work of Frey, Nagel, Marx, and others on this subject. Frey had found that the cornea responded to various stimuli only with sensations of pain. Nagel criticized his technique, and believed from his own work that it possessed also sensations of cold and pressure. Rizzo repeated their methods and those of Marx, and concludes that no technique yet worked out is sensitive and reliable enough to furnish definite conclusions on this point.

S. R. Gifford.

Stoewer, P. **Formation of vesicles and cysts in and on the cornea.** Klin. M. f. Augenh., 1927, v. 79, Dec., p. 779.

After extraction of senile cataract a woman developed keratitis bullosa and total sclerosis of the left cornea. After several months a central cyst formed on the right cornea. The anterior wall was removed and the wound touched with tincture of iodin. Microscopically the tissue consisted of normal corneal epithelium covering a membrane of a structure similar to the lamellæ of the cornea.

C. Zimmermann.

Szily, A. **Operation for keratoconus.** Klin. M. f. Augenh., 1928, v. 80, Jan., p. 36. (1 ill., 1 table.)

Von Szily had very satisfactory results from superficial cauterization of the apex of the cones with the dull galvanocautery in an area of about three millimeters, repeated two or three times at intervals of from eight to ten days. After final cicatrization a small iridectomy is performed at the optically best site, followed after a short time by tattooing with gold chloride.

As an example of the connection between traumatism and parenchymatous keratitis, a girl, suffering since her earliest childhood from congenital luetic parenchymatous keratitis with keratoconus, which had healed with a perfectly clear cornea, had a relapse of the keratitis after each cauterization.

C. Zimmermann.

7. UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Axenfeld, Th. **Operative detachment of adhesions between cornea and iris.** Klin. M. f. Augenh., 1927, v. 79, Nov., p. 611. (14 ill.)

Axenfeld reports a case of large cyst of the iris, adherent to the posterior surface of the cornea. After puncture of the cyst its wall was detached with the back of a cataract knife, not allowing escape of aqueous, and finally extirpated.

In a case of secondary glaucoma the corelysis was performed after reduction of tension by cyclodialysis and posterior sclerotomy. Axenfeld demonstrates the usefulness of posterior sclerotomy in front of the ora serrata at the region of the pars plana, where there is less danger of late detachment of the retina, by a T-shaped incision, in certain cases of glaucoma.

C. Zimmermann.

Denig, Rudolf. **Isolation of older inflammatory incarcerations and prolapses of the iris.** Klin. M. f. Augenh., 1927, v. 79, Nov., p. 599. (2 ill.)

In prolapse of the iris older than twelve days excision is not without danger. Denig isolates the prolapse by an iridectomy to the right and left side of it, or, if a coloboma exists, to one side of it. In eleven out of twelve cases the result was favorable, the prolapse gradually flattening with subsidence of irritation.

C. Zimmermann.

Fodor, G. **Complement binding reaction with pigment in injuries of the eye.** Klin. M. f. Augenh., 1927, v. 79, Dec., p. 759.

Fodor tested the complement binding reaction of Wood on a large number of cases. He describes the preparation of pigment antigen and the performance of the reaction in detail. The results partly coincided with, partly differed from, those of Wood, and thus cannot be considered as definite, or, with regard to sympathetic ophthalmia, as specific. A trial of the method is indicated but only as far as compatible with the health of the patient.

C. Zimmermann.

Fuchs, E. **Edema and cysts of the ciliary epithelium.** Graefe's Arch, 1927, v. 118, p. 681.

The author reiterates his opinion that in the posterior fourth or third of the orbiculus ciliaris the ciliary epithelium may be found in many cases to normally consist of several layers.

Edema of the ciliary epithelium usually involves the entire width of the orbiculus ciliaris. The individual cells first become higher and thinner, and fluid appearing between them finally presses the protoplasm of the cells internal to the nuclei into long fine threads. The nuclei of these cells at the same time become longer and thinner and gradually move inward from their normal position near the base or outer end of the cell.

This condition of edema of the ciliary epithelium or accumulation of fluid between the cells is pathologically distinct from cystoid degeneration or an accumulation of fluid within the cells. It was found, from the study of otherwise normal eyes, that in those with cystoid degeneration of the ciliary epithelium there was no close relation with the condition of edema. Cystoid degeneration is chiefly a senile change. There occurs first an atrophy of the retinal elements so that gaps occur which become filled with fluid.

Edema of the ciliary epithelium was found considerably more frequently in diseased than in normal eyes. It occurred chiefly in staphyloma of the cornea, glaucoma, ulcus serpens, and other kinds of corneal ulcer, perforating injuries, etc.

The common cyst of the ciliary processes is formed by a detachment of the unpigmented from the pigmented epithelium. A second form of cyst found in the ciliary processes is that arising in rabbits' eyes after sudden loss of the aqueous humor. In the latter form both epithelial layers are elevated and in contrast to the cysts of the first kind the contents include albumen and sometimes blood.

In the orbiculus ciliaris there are also two varieties of cysts. The first is formed either within edematous ciliary epithelium or, when the cyst is larger, by separation of the ciliary from the pigmented epithelium. The second kind are large and are produced by the detachment of ciliary epithelium due to the pull of inflammatory membranes attached directly to the ciliary epithelium or indirectly through zonular fibers. *H. D. Lamb.*

Fuchs, E. **Foam-like deposits in the choroid.** Graefe's Arch., 1927, v. 118, p. 697.

The author reports the presence in the choroid of many, mostly very small, indistinctly outlined light areas and vacuoles lying in a homogeneous ground material. The appearance is that of foam or of a fine honeycomb. In some of the larger deposits there are also several larger vacuoles. The smallest infiltrations are frequently without an apparent nucleus, but the larger have one or several nuclei, small, round, and rich in chromatin. Superficial limiting membranes to the deposits cannot be recognized. These infiltrations lie in the looser layers of the choroid, external to the large vessels. They were found in great numbers in both eyes of a sixty-two year old man dying with myodegeneratio cordis, arteriosclerosis, extensive pulmonary tuberculosis with cavities, purulent pleurisy, tuberculous ulcers of the intestine, and a small ulcerating carcinoma of the sigmoid flexture.

H. D. Lamb.

Gyotoku, Katsuto. **Contribution to our knowledge of the clinical and histological findings in the leprous eye.** Zeit. f. Augenh., 1927, v. 63, Nov., p. 254.

A statistical study of three hundred clinical examinations of the eyes of Japanese lepers and a histological study of thirty eyes are presented. Borthen's classical study was based on 457 cases. Leprosy appears in three forms: Lepra tuberosa, Lepra nervosa and Lepra maculosa. The eyes are involved in sixty-three per cent of the cases and it is chiefly the anterior segment that suffers.

Corneal leproma is the commonest corneal form; also pannus leprosa, keratitis punctata superficialis leprosa, and keratitis parenchymatosa leprosa are also observed. The parenchymatous form starts with nodules in the periphery and gradually involves the anterior cornea. In 119 cases of lepra nervosa no corneal leproma occurred. The chief lesion in this form is keratitis with lagophthalmus which ends in a thick tuberous pannus. In lepra maculosa the eye is only occasionally involved. Episcleritis is not uncommon, usually occurs near the limbus, and is often complicated with iritis. The uvea is involved second in frequency to corneal leprosy, but only seven per cent of the iritides were uncomplicated by scleral and corneal lesions. Nodules in the iris were not seen and Borthen had found them rare. He found no eye ground lesions. Hemeralopia was seen rarely, though Borthen found it frequently.

Pathology: 30 eyes from 17 cases were examined histologically. In the cornea nodules of typical leprous structure were found and bacilli were demonstrable. In iris and ciliary body there was thickening and an infiltration with lymphocytes and plasma cells. In the center of the nodules was a structureless, poorly staining mass. Simple iritis was found but once, usually it was complicated with leproma of cornea or episclera. Pannus was clinically like trachoma pannus and consisted of infiltrates over and under Bowman's membrane, which sometimes ended deep like a parenchymatous keratitis. In the posterior half of the eyeball no specific lesion was found. The author believes infection of the eyeball to be exogenous through the conjunctiva.

F. H. Haessler.

Jese, L. **Injury to the eye from smallpox vaccination.** Zeit. f. Augenh., 1927, v. 63, Dec., p. 338.

This is rare. Metastatic choroiditis, involvement of the optic nerve, and embolus of the central artery have been

reported, and Groenouw states his belief that there are very few well established cases of injury of the deeper ocular structures following vaccination. Jese reports two cases. In a child of one year vaccination was followed in four days by severe symptoms of general illness. After fourteen days the mother noted that the child seemed blind, and, although the eyeballs were normal externally and the fundus normal, and the pupils reacted normally, the child did not show signs of seeing a light in the dark room, nor did it follow a light. Recovery occurred in three months. The author assumes an encephalitis with involvement of the central ganglion. In case two there was an obvious metastatic ophthalmia with presumable embolism of the central artery of the retina in one eye. The author does not believe that the virus is the direct etiological agent of the pathologic changes in the eye, but that it is indirectly provocative.

F. H. Haessler.

Jones, J. H. **The relation of the inorganic constituents of a ration to the production of ophthalmia in rats.** Jour. of Biol. Chem., v. 75, Oct., p. 139.

The ration containing five per cent butter fat which McCollum, Simmonds, and Becker claim regularly leads to the production of xerophthalmia in rats was investigated. If the butter fat was incorporated into the ration at intervals of about five days, the animals grew normally and did not develop sore eyes. If the butter fat was added to the same ration in quantities sufficient to last six or seven weeks, xerophthalmia developed in the course of ten weeks or less, with subsequent loss of weight and death of the animals. If the butter fat was incorporated at less frequent intervals, the time elapsing before the development of xerophthalmia depended upon the amount of ferrous sulphate in the ration. It is suggested that the failure of the animals under these conditions was due to an oxidative destruction of vitamin A, the speed of oxidation being increased by the catalytic action of the ferrous sulphate.

D. H. O'Rourke.

Lottrup-Andersen, C. **A case of necrotic iritis.** Acta Ophth., 1927, v. 4, no. 3, p. 284.

The fifty-three year old woman whose case is described by Lottrup-Andersen had Basedow's disease in a mild form, with slight exophthalmus and lagophthalmus. She had had repeated small erosions of the lower corneal margin which had always healed readily. Later she developed a severe ulcus serpens and during the course of treatment a sector-form area of the iris above became necrotic. All layers of the iris were affected and later the necrotic area was represented by an atrophic fibrous tissue. The patient was not syphilitic.

E. M. Blake.

Macklin, Madge Thurlow. **Hereditary abnormalities of the eye.** Canadian Med. Assoc. Jour., 1927, v. 17, Dec., p. 1493.

Citations from the literature emphasize the importance of the factor of heredity in abnormalities of the eye. Strabismus, ophthalmoplegia externa and interna, nystagmus, myopia, hyperopia, astigmatism, sarcoma, choroiditis, coloboma of the optic nerve, and defective structure of the tear ducts are considered. A comprehensive bibliography is given. A plea is made to arouse the interest of the eye specialist as well as the general practitioner to the importance of the subject of inheritable diseases to the public at large and to patients.

D. H. O'Rourke.

Schlodtmann, W. **Depigmentation of the irises of an adult.** Klin. M. f. Augenh., 1927, v. 79, Sept., p. 339.

A student aged nineteen years had brown eyes in 1921, but in 1925 they had become bluish-grey in the broader ciliary portion, while the pupillary portion had remained brown. The father had greyish-blue eyes, as did the other children, while the mother had brown eyes. The patient's eyes showed no pathologic changes. The case supports the opinion of Lutz that the pigment develops normally but that later depigmentation may take place merely from crossed heredity. So far this has

only been observed in one eye, and the case is unique. In accordance with the conception of Streiff, it proves that in bilateral heterochromia crossed heredity also plays an important part.

C. Zimmermann.

Velter, E., and Tournay, A. **Inequality of the pupils.** Arch. d'Opht., 1927, v. 44, Dec., p. 721.

A classification of disturbances of the pupil is suggested, based upon conditions affecting first the constrictor muscle of the iris, and second the dilator of the iris. The literature is gone into at some length and the anatomy of both the sympathetic and the parasympathetic tracts of the pupil is described. The writers conclude that there are three general modes of production of inequality of the pupils: first by direct action upon the course of the constrictor or dilator tracts and nerves; second by reflex unilateral action caused by excitation of the nerve; and third by action at a distance, due to the fact that the entire sympathetic system of that side has become hypersensitive. The article is a good review of conditions which may cause inequality of the pupils.

M. F. Weymann.

8. GLAUCOMA AND OCULAR TENSION

Davis, W. L. **Glaucoma.** Virginia Med. Monthly, 1928, v. 54, Jan., p. 628.

The author reports three instructive cases, and draws the following conclusions: Increased intraocular tension alone does not account for all symptoms in all cases of glaucoma. Careful study of many cases of so-called glaucoma will give evidence of low grade uveitis. May not the chronic uveitis affect the epithelium of the ciliary processes, producing a condition analogous to that seen in chronic nephritis in which the secretory epithelium suffers? It may be that ensuing alteration of the aqueous will cause it to have a toxic effect and so further affect the integrity of the ocular tissues.

D. H. O'Rourke.

Fabricius-Jensen, H. **The influence of lumbar puncture upon intraocular pressure.** Acta Ophth., 1926, v. 4, no. 1, p. 36.

Thirty patients were studied, comparing the blood pressure and the intraocular pressure after the removal of spinal fluid in amounts of two to six c.m. The spinal fluid pressure dropped in all but two cases. The intraocular pressure fell in sixteen cases an average of 5.1 mm., was increased in five cases an average of 4.6 mm., and in nine cases was unchanged. The blood pressure dropped in thirteen cases, an average of 15 to 20 mm. The author feels that lumbar puncture exerts no definite effect upon intraocular pressure.

E. M. Blake.

Fremont-Smith, Frank, and Forbes, H. S. **Intraocular and intracranial pressure.** Arch. Neurol. and Psych., 1927, v. 18, Oct., pp. 550-564.

This is a report of very carefully made and interesting experiments from which it is shown that in animals changes of hydrostatic or of osmotic pressure induced in the blood produce parallel changes in intraocular and intracranial pressure. These pressures vary directly with variations in general venous pressure, and this in turn has been shown by previous writers to be related to the composition of the plasma.

L. T. P.

Gjessing, H. G. A. **Results of iridencleisis operations by Holth's method, especially with meridional iridotomy.** Norsk Mag. for Laegevid., 1927, v. 88, Sept., p. 737.

The author tabulates ninety-two cases treated by Holth's method, with the results as to tension, visual acuity, and visual field. He states the following conclusions: Holth's antiglaucomatous iridencleisis (especially with meridional iridotomy) gives a relatively safe and lasting result without exposing the eye to considerable later risk, because (a) a thin conjunctival bleb is not formed over the incarcerated iris, so that Seidel's fluorescein phenomenon is negative, and for the same

reason late infection very rarely occurs; (b) the ciliary body is never drawn into the wound, as one not rarely sees happen with Elliot's operation, but is covered by a scleral wedge; and (c) ocular hypotension does not develop. The cosmetic result is commonly good and the eye is not exposed to dazzling.

W. H. C.

Hamburger, C. **Prevention of acute attacks during glaucosan treatment.** Klin. M. f. Augenh., 1927, v. 79, Aug., p. 232.

Two cases are reported in which the attacks were cured by histamin. Hamburger therefore recommends instilling two drops of histamin (aminglaucosan) one hour after the first glaucosan instillation. *C. Zimmermann.*

Hamburger, Carl. **Treatment of glaucoma with glaucosan, glaucosan drops and amine-glaucosan drops.** Arch. of Ophth., 1926, v. 55, p. 533.

This paper is largely repetition of papers previously published by the author in the German literature, and mentioned from time to time in the Ophthalmic Year Book.

Heim, Heinz. **Treatment of glaucoma with ergotamin.** Klin. M. f. Augenh., 1927, v. 79, Sept., p. 345.

Seventeen cases of different kinds of glaucoma were treated with from two to three tablets of 0.001 gm. of ergotamin tartrate (bynergen) by mouth, with good results. Its effect lasts longer than that of the usual miotics, and was observed in cases where these had failed. The author believes that by the right application of ergotamin and the right selection of cases, this drug with or without the usual miotics yields better results than operation. Experiments suggested an amphotropic action of ergotamin, checking the sympathetic and sensitizing the parasympathetic for normal stimuli.

C. Zimmermann.

Holth, S. **Iridencleisis with meridional iridotomy in acute glaucoma. Iridencleisis with transverse iridotomy recommended in infantile glaucoma.** Klin. M. f. Augenh., 1927, v. 79, Nov., p. 620. (3 ill.)

Holth maintains, and shows on the basis of several cases, that iridencleisis with iridotomy gives much better lasting results in acute glaucoma than iridectomy. In infantile glaucoma no sclerectomy, including Elliot's trephining, gives a permanent result. He recommends an attempt with iridencleisis with transverse iridotomy.

C. Zimmermann.

Howard, H. J. **Spontaneous trephining of the eyes of a Chinese in glaucoma.** China Med. Jour., 1927, Nov., p. 910.

Double "spontaneous trephining", or intercalary rupture in absolute glaucoma of the chronic simple type, is reported. Beneath the conjunctiva of the right eye two mm. above the upper limbus was a small oval-shaped rupture of the sclera, through which the structures beneath looked grayish brown, evidently iris and ciliary body. There was a very slight protrusion of this area, but nothing that could be called a real ectasia. The appearance of the rupture in the left eye was a good deal the same as in the right, except that it was much smaller and the color of the area lighter.

D. H. O'Rourke.

Koyanagi, Y. **Occurrence of so-called Schnabel's caverns in the optic nerve of the nonglaucomatous eye.** Klin. M. f. Augenh., 1927, v. 79, Sept., p. 371. (8 ill.)

(See section 11, Optic nerve and toxic amblyopias.)

Meyer, Jean. **A case of atrophy of the optic nerve with excavation and without hypertension.** Arch. d'Ophtal., 1928, v. 45, Jan., p. 46.

The patient, a man sixty years old, presented a typical history and objective findings of glaucoma except that the tension was 21 mm. Schiötz in each eye. The nasal field was restricted and there was typical glaucomatous cupping of the discs. Repeated observations for forty days showed no hypertension. The retinal

arterial pressure was subnormal. The use of miotics in the left eye only caused an equal fall of tension in both eyes. The writer believes that the apparent normal tension was above the actual normal tension for this individual, who had a lowered retinal arterial pressure and a weak lamina cribrosa. The patient should have antisyphilitic treatment and a Lagrange or similar filtration operation to reduce the tension.

M. F. Weymann.

Plentneva, A. **Glaucosan in glaucoma.** Archiv Oftalmologii (Russian), 1927, v. 3, pt. 3, p. 415.

Hamburger's levoglaucosan in the form of eyedrops has been used by the author in ten cases of simple and chronic inflammatory glaucoma. In seven cases the results were satisfactory: the tension was lowered to normal limits, the period of observation being rather short—from one to twenty days. In one case glaucosan precipitated an acute glaucomatous attack.

Dextroglaucosan in the form of subconjunctival injections was used in four cases of simple glaucoma and in one case of chronic inflammatory glaucoma. Only in two cases was a definite hypotonic action noticed: in two the tension remained the same, and in one it was raised.

Aminglaucosan as proposed by Hamburger for acute glaucoma was tried in nine cases. In each a considerable congestive reaction in the conjunctiva and skin followed, the pupil was greatly contracted, and the tension was lowered.

M. Beigelman.

Samojloff. **The oxidation process in the ciliary epithelium, and reaction hypertension of the eye.** Graefe's Arch., 1927, 118, p. 391.

The secretory activity of the ciliary epithelial cells, marked by a decided process of oxidation, can be demonstrated by the indophenol-blue synthesis of Ehrlich or the production of an intense blue staining in the ciliary epithelial cells by immersion of the tissue in α—naphthol+dimethyl—p—phenylendiamin, the so-called Nadi mixture.

The left eye of an albinotic rabbit is punctured with a fine hypodermic needle and the aqueous humor drawn out. A counterpuncture is then made with the needle and the needle is left in the eye. At the end of fifteen minutes the anterior chamber has reformed and there has occurred a marked hypertony of the punctured eye.

The rabbit is then at once decapitated, the ciliary bodies of both eyes excised and frozen sections made from them. These sections are immediately put into the Nadi mixture. Microscopic examination of the sections always showed much less blue staining in the ciliary epithelial cells of the punctured eye than in those of the control eye.

This experiment shows that in spite of the exceptionally intense production of aqueous humor as the result of the puncture there is really less physiological secretory activity of the ciliary body in the punctured eye than in the fellow eye. An active hyperemia occurs in the ciliary processes as a reaction to the puncture. The marked increase of blood-pressure in the vessels of the ciliary body causes an intense transudation of the blood plasma through the dilated capillary pores. The intraocular tension increases until it reaches that of the increased blood-pressure in the ciliary arteries.

After the stage of reaction has subsided, the pressure in the ciliary arteries diminishes and the vessel walls return to their normal permeability. The eye becomes hypotonic until the normal mechanism of aqueous humor production is restored.

H. D. Lamb.

Sanyal, Saradindu. **Some points about glaucoma in epidemic dropsy.** Med. Review of Reviews, Calcutta, 1927, March.

The author reports 35 cases of glaucoma in epidemic dropsy. Glaucoma occurred more in the mild cases than in the severe. Age variation was from 18 to 57 years, 26 per cent in each of the decades 21 to 30 and 41 to 50, 50

per cent in the decade 31 to 40), middle age apparently being most liable to the disease. Males 59 per cent and females 41 per cent were affected. Commonest complaint was a halo of rainbow color when looking at light. There was no pain; slight haziness of cornea and occasionally ciliary congestion were present. Pupil was normal or slightly dilated and reacted normally or sluggishly. Most cases showed cupping of optic disc and field of vision was contracted concentrically, most marked in lower nasal side. The last portion of the field to disappear was the upper temporal. Tension varied from 70 to 80 mm. (Schiötz). If not treated vision gradually diminished and was completely lost. Some cases responded to miotics, others required operation. Iridectomy was found to be satisfactory, as was trephining.

The author's hypothesis was that evidence pointed to a toxèmia which damaged the sympathetic system as well as the vascular wall, especially of capillaries and veins. The loss of vascular tone caused a stasis of intraocular fluids which permitted the deposit of formed elements in the channels of exit.

L. T. P.

Sanyal, Saradindu. **Sympathetic system in relation to glaucoma.** Med. Review of Reviews, Calcutta, 1927, Sept.

This is a further discussion on the cause of glaucoma as based on the epidemic of dropsy with associated glaucoma previously reported. The author regards the essential cause as being in the sympathetic system.

L. T. P.

Schiötz, H. **A tonometer with convex tip.** Acta Ophth., 1926, v. 4, no. 1, p. 20.

Schiötz describes his experiments with the tonometer, using plungers with concave, plane, and convex ends. Charts are shown which illustrate the differences in measurement with the different surfaces. In general there is not a great deviation from the measurements observed with the older instrument with a concave end. Although the convex end is probably more accurate, especially in thicker and less elastic corneas, the author advises the continued use of the older and well tried instrument, at least for the present.

E. M. Blake.

Waite, Herbert J. **How primary glaucoma may arise from disturbances in the physicochemical forces which regulate intraocular fluid exchange.** Arch. of Ophth., 1927 Sept. and Nov., v. 56, p. 460 and p. 552.

Fluid exchange between blood and aqueous appears to be the resultant between the physicochemical forces which regulate the semipermeability of the capillary walls and of the ciliary epithelium, the osmotic pressure of the blood colloids, the blood pressure within the ocular capillaries, and the intraocular pressure. It is suggested that the capillaries of the ciliary body carry a blood pressure sufficiently high to overcome the intraocular pressure combined with the osmotic pressure of the blood colloids, thereby giving rise to the aqueous as an ultrafiltrate. It is suggested that the capillaries of the iris and the collateral vessels draining Schlemm's canal carry a blood pressure lower than this critical level, thereby effecting an osmotic reabsorption of aqueous into the blood stream here. With so many variables it is possible that the formation and reabsorption of aqueous need not progress at a uniform rate.

Primary glaucoma may arise from an imbalance in these forces, whereby fluid inflow is increased, or fluid outflow is decreased, or both. It is suggested that the ciliary epithelium in glaucoma becomes abnormally permeable to all the constituents of the blood. The blood colloids may pass through the ciliary epithelium in glaucoma. Ferments in the aqueous probably split the colloids into molecules small enough to escape by diffusion into the blood stream. But the blood colloids which are caught within the colloidal framework of the vitreous are probably more shielded from ferment action; hence the vitreous is caused to swell,

the anterior chamber is made shallow, and the root of the iris is brought in contact with the pectinate ligament.

M. H. Post.

Wollenberg, A. **Value of posterior sclerotomy.** Klin. M. f. Augenh., 1928, v. 80, Jan., p. 94.

Wollenberg emphasizes the great value of posterior sclerotomy in glaucoma especially as an emergency measure for ophthalmologists practising in the country. He illustrates the good effect by two clinical histories.

C. Zimmermann.

9. CRYSTALLINE LENS

Atkinson, W. S. **Safety measures in cataract extraction.** New York State Jour. of Med., 1927, v. 27, Dec. 13, p. 1349.

The measures here described and advocated are paralysis of the orbicularis by infiltration of the lids with novocain solution and closing the incision with a suture. To paralyse the orbicularis and prevent squeezing, two percent solution, with one or two drops of adrenalin solution, was used. Among fifty cases of extraction the vitreous presented in only two, both of subluxated lenses and in only one was vitreous lost. With paralysis of the orbicularis the suture can be introduced either before or after the corneal incision is made. But introduction of the suture before making the incision, and leaving it untied, as suggested by Berens (A.J.O. vol. 8, p. 112) allow it to be tightened instantly to meet an emergency. A needle holder without catch, and a forceps for tying that does not allow the silk to slip, add to the ease and safety of the procedure.

E. J.

Axenfeld, Th. **Keratoconus and senile cataract.** Klin. M. f. Augenh., 1928, v. 80, Jan., p. 41.

Axenfeld had two casesof keratoconus with senile cataract. In one extraction with round pupil and a very small basal excision of the iris gave an excellent result.

C. Zimmermann.

Mamoli, L. **On the mechanism of cataract production by thallium.** Annal. di Ottal., 1927, v. 55, Jan.-Feb., p. 35.

The author studied in white rats the effect of giving small doses of thallium acetate by mouth. Besides general effects common to chronic poisoning by the heavy metals, effects peculiar to thallium were a marked alopecia developing after ten days' use of the drug, and an arrest in normal growth when it was fed to young animals. This was accompanied by changes in the bones, softness, frequent fractures, and other signs of abnormal bone formation. Buschke had found in such animals a diminution of the blood calcium, and believed the alopecia, osseous dystrophy and cataract formation were due to the effect of thallium on the parathyroids. The author made sections of the parathyroids and estimated their lipoid content in his animals, finding signs of degeneration in only two. These animals showed alopecia and osseous dystrophy, but not cataract. He also examined the pancreas in sections, and found in two animals distinct signs of degeneration. One of these showed alopecia and faulty growth, but no cataract; the other normal growth but alopecia and bilateral cataract.

Twelve animals, or about thirteen per cent, showed cataracts which appeared after about four weeks of feeding and went on rapidly to complete maturity. A few others showed slight lens opacities which cleared up while the drug was still being given. The animals with complete cataract were all members of four litters. Five animals showed signs of iritis with posterior synechiæ.

In considering the possible relation between cataract formation and parathyroid deficiency in these animals, the author noted in his animals complete absence of two classical signs of parathyroid deficiency, tetany and changes in the teeth. Also no relation was ob-

served between the occurrence of cataract and other changes, such as alopecia or osseous dystrophy, which might be considered signs of such deficiency. Thus it may be said that no clear relation of thallium cataract to parathyroid dysfunction has been demonstrated. With the idea that lesions of the pancreas might be at fault, the blood sugar of the animals was estimated. A hyperglycemia at the beginning of treatment was replaced later by a definite hypoglycemia. This was accompanied by marked polyphagia and loss of subcutaneous fat, indications of an increased carbohydrate metabolism, the relation of which to the histologic changes found in the islands of Langerhans cannot be definitely explained. The relation of this change to cataract formation is also uncertain, although the vesicular degeneration of the capsular epithelium of the lens and the rapidity of cataract formation in connection with the hyperglycemia offer interesting analogies to diabetic cataract. *S. R. Gifford.*

Pellathy, Adalbert, and Pellathy, Stefan. **Calcium content of the blood serum in senile cataract and the causes of senile cataract.** Klin. M. f. Augenh., 1927, v. 79, Aug., p. 198.

The calcium content of the blood may serve as a gauge of the function of the parathyroid gland. The author examined forty-eight cataract patients as to the calcium content of the blood, and found the difference from that of normal subjects so small that a hypofunction of the parathyroid gland could not be inferred from it.

C. Zimmermann.

Szillinsky, R. **Injury of the lens capsule: the question of a zonular lamella.** Klin. M. f. Augenh., 1927, v. 79, Sept., p. 389.

The left eye of a man was injured by a steel wire, causing a round perforation of the cornea, from which it was extracted, and a triangular rupture of the lens capsule. The capsular flap was absorbed after a week and the wound in the capsule completely covered, without lens opacity; this being probably due to preservation of the epithelium from which the capsule had been torn, preventing the entrance of aqueous. The author considers it very doubtful whether all grey deposits on the anterior capsule in the pupillary area described as detachment of the zonular lamella should be so considered. *C. Zimmermann.*

Vannas, Mauno. **Luxation of a secondary cataract into the anterior chamber and the mechanism involved.** Acta Ophth., 1927, v. 4, no. 3, p. 262. (1 col. pl.)

Vannas' patient had been operated upon by discission and extraction of juvenile cataract in each eye at the age of seven years. At the age of 44 years the right eye was struck by a piece of frozen earth and the membranous cataract luxated into the anterior chamber. This unique occurrence is explained as resulting from the backward rush of aqueous through the pupil and the hole in the membrane, striking the middle of the vitreous body. The forward displacement of the lateral portions of the vitreous everted the edges of the membrane, rupturing the zonula and forcing the membrane into the anterior chamber, where it resumed its original form.

E. M. Blake.

10. RETINA AND VITREOUS

Cervellati, Ezio. **Retinitis proliferans.** Annal. di Ottal., 1927, v. 55, March-April, p. 197.

The voluminous literature on this subject is briefly reviewed. Previous authors have either joined with Manz, who recognized the frequent association of intraocular hemorrhages with the new-formed connective tissue, but believed that the latter was the essential feature of the disease, that it was formed by the retinal tissue, and that the hemorrhages were not the primary cause of it; or have shared the opinion of Leber, that the hemorrhages are the essential factor, and the cause of the connective tissue formation. The author describes four typical cases of retinitis proliferans and two of allied

conditions from his own observation, and three others observed by Professor Baquis, in two of which a histological examination was obtained. Three of his typical cases were due to syphilis, the other to trauma. One of Baquis' cases was especially interesting because each eye was seen when only retinal hemorrhages were present, these giving place later to the typical picture of retinitis proliferans. Another, secondary to thrombosis of the central vein, showed in sections that the connective tissue did not originate from the retina, but apparently from cells in the hemorrhage itself.

The author quotes the experimental work of Probsting, who injected blood into the vitreous of rabbits, and could follow in sections the formation of new connective tissue in the blood when it was of sufficient amount not to be absorbed rapidly. He concludes that all cases with new connective tissue in the vitreous should be included under the name of retinitis proliferans, which does not represent a distinct disease but only a symptom. It may be due to various causes, mechanical, toxic, and infectious, but syphilis has been responsible for the largest number of cases. The formation of connective tissue is due solely to hemorrhages, and never occurs when these are absent. The blood, is absorbed quickly, breaks down into chemical components which are irritating to the surrounding tissues, and which cause the migration of fibroblasts, a condition analogous to what occurs in a thrombosed vessel. Proliferation of the retina itself is not responsible for the new tissue, as histological examinations have shown. (Bibliography.)

S. R. Gifford.

Crocco, A. **Cysts of the retina. Archivos de Oftalmologia de Buenos Aires.** 1927, no. 9, p. 717.

The ophthalmoscopic appearance of multiple cysts in the retina of a young man apparently healthy is given. In the absence of symptoms suggesting entozoa, or a retinal tumor, and in the presence of inflammatory and atrophic changes in the chorioretina, the author attributes the formation of retinal cysts in his case to active exudation in a chorioretinitis which had previously caused cicatricial adhesion between the choroid and retina.

M. Beigelman.

Fileti, Antonio. **Ocular changes in pernicious anemia.** Annal. di Ottal., 1927, v. 55, March-April, p. 258.

Six cases are reported, in five of which the fundus changes could be correlated with the histologic lesions seen in the eyes examined after death. The nerve heads showed a blurring of the borders, which was marked in two cases, less marked in the others. One nerve-head showed distinct elevation. The blurring of the borders became more marked with progress of the anemia, and was associated with pallor of the nerve, especially in the more advanced cases. The characteristic retinal change was the presence of hemorrhages, chiefly small ones, some of which showed a whitish-yellow or greyish central area. They were seen in all parts of the retina, but were most numerous near the nerve, along the large vessels. The macular region was involved in half the cases. The white areas unassociated with hemorrhages described by other authors were not seen in these cases. A constant phenomenon was congestion of the veins, while the arteries were normal or slightly narrowed. The effect of the lesions on vision depended on their location, and often patients with macular lesions did not complain of poor vision on account of their serious general condition.

Sections showed the hemorrhages in all layers of the retina, and varying in size from collections of red cells between the cells to larger masses which caused disorganization of the retinal tissue. In half the cases, these were seen in the macula, and in one of these a sacculated preretinal hemorrhage was present exactly in the foveola. The white centers present in some showed fewer red cells and more leucocytes, both types of cell being partly degenerated. The larger ones formed nodules projecting slightly into the vitreous,

and in these the chief mass consisted of a homogeneous, finely granular material which was apparently made up of broken-down blood cells and coagulated serum.

Degenerative lesions of the retina consisted in degeneration of ganglion cells and swelling of the nerve fibers, sometimes producing marked thickening of the nerve fiber layer. Such areas were always surrounded by red cells, and the swelling was thought to be due to disturbed nutrition occurring as the result of hemorrhages. Degenerative lesions of the vessels were not marked. In two cases some of the vessels walls were disorganized, so that the adventitia was separated from the rest of the vessel, the space having probably been occupied by fluid from the vessel. Many vessels showed thrombi in various stages of organization. All the globes showed a marked edema of the retina, the nerve fiber and external plexiform layers being most involved. All the changes seen could be considered of hemorrhagic nature, probably due to lesions in the vessel walls, and the fact that such hemorrhages are much more frequent in pernicious anemia than in other equally severe anemias indicates that such vascular lesions depend on some factor in pernicious anemia whose nature is as yet unknown. (Microphotographs and bibliography.)

S. R. Gifford.

Lederer, Rudolf. **Peculiar ophthalmoscopic changes in ischemia of the retina.** Klin. M. f. Augenh., 1928, v. 80, Jan., p. 1. (3 ill. and 3 col. pl.)

A woman aged forty-nine years complained of flickering for six days. Vision was normal, but the upper half of the visual field was lacking. The corresponding part of the fundus was whitish opaque, and the veins showed clearly defined streaks. The author considers this as representing perivascular lymph spaces which became visible in the edematous retina from being filled with fluid of different color, most probably coloring matter of the blood which had passed through the diseased walls. The affection was attributed to early sclerosis and an exudative condition, very clearly syphilitic. There was also congenital mitral stenosis.

In the second case, of probably syphilitic endarteritis, the upper half of the retina showed a milky opacity with white tortuous formations twice the width of the veins, the nature of which could not be explained.

C. Zimmermann.

Lindau, Arvid. **The question of angiomatosis retinæ and brain complications.** Acta Ophth., 1927, v. 4, no. 3, p. 193.

Lindau's observations support von Hippel's contention that retinal angioma represents a glial reaction and must be strongly differentiated from teleangiectasis and retinitis exudativa (Coats' disease). The brain complications are considered to be angiomatous tumors with a tendency to cyst formation in the nervous substance. These processes in the brain and cord should be grouped under the term "angiomatosis of the central nervous system." There is a tendency to familial disposition and association with other malformations. The angioplastic tumors are identical with Cushing's peritheliomas of the brain.

E. M. Blake.

Lister W. T. **Some points in connection with detachment of the retina.** Brit. Med. Jour., 1927, Dec. 17, p. 1127.

The author believes that a large number of cases of detachment are treated on a routine plan, without sufficient endeavor to find the cause. The mechanism of detachment is that the retina is either "pushed in" from without, "dragged in" from within, or "floated in" when there is a hole. Treatment, if attempted, should be thorough and along the following lines: In retinitis striata and in diffuse fibrous degeneration of the vitreous all treatment is useless. In detachment associated with a hole treatment offers little chance of success. Definite fibrous bands in the vitreous may be divided. Detachment associated with retinitis or choroiditis should be ac-

tively treated. Simple detachment in which the mechanism of the detachment is not determinable should be given the benefit of the doubt and treated. *D. H. O'Rourke.*

Löhlein, W. **Formation of folds in the retina by pressure upon the eyeball.** Klin. M. f. Augenh., 1927, v. 79, Dec., p. 769. (6 ill.)

A case is described in which horizontal folds of the retina were observed in consequence of permanent vertical pressure upon the globe by a mucocele of the frontal sinus. This is ascribed to a change of curvature of the posterior segment, with correspondingly changed conditions of tension of the retina in the sense of compression from above and stretching horizontally. It was accompanied by corneal astigmatism according to the rule. This and the folds persisted after removal of the tumor, although the rapid and considerable improvement of vision indicated that some changes in the single folds (slight flattening) must have occurred without being noticeable ophthalmoscopically.

C. Zimmermann.

Scullica, Francesco. **The atypical form of central chorioretinitis.** Ann. di Ottal., 1927, v. 55, Jan.-Feb., p. 110.

The case is reported of a man of twenty-nine years whose right eye had been poor since early in life. At the age of eighteen and again just before the author saw him, the vision in the left eye had decreased. Vision was reduced to right eye 1/10, and left eye 1/12. The right eye showed an old patch of atrophy involving the macular area, the retina and choroid being practically destroyed in this area. The left eye showed an edema of the whole central retina, with an area of beginning artophy in the center. The author was able to watch the development in this region, after six months, of a larger area of atrophy involving most of the retina and choroid. Due to disappearance of the retinal edema, vision improved to 2/10. He believes the inflammatory process, for which none of the ordinary causes could be found, had its origin in the choroid, as this was so far destroyed that none of the choroidal vessels was visible, and that the retinal atrophy was secondary. He reviews the theories of nontraumatic hole in the retina. (Bibliography and three plates).

S. R. Gifford.

11. OPTIC NERVE AND TOXIC AMBLYOPIAS

Dworjetz, Max. **On the justification for the term "atrophy of the optic nerve".** Klin. M. f. Augenh., 1928, v. 80, Jan., p. 30.

The author reports nine cases of objective total atrophy of the optic nerve with perfect vision, which shows that it is not always possible to diagnose atrophy of the optic nerve from pallor of the disc alone. He regards the main cause of the pallor in such cases as exuberance of neuroglia between the optic fibers, replacing the degenerated medullary sheaths while the axis cylinders remain unaltered. For such cases with normal or almost normal vision the term hypotrophy of the optic nerve is more appropriate.

C. Zimmermann.

Turtz, Chas. A. **Absence of the optic nerve.** Jour. Ophth., Otol., and Laryng., 1927, v. 31, Sept., p. 308.

This is a case of absence of the optic nerve in which the anterior segments of the eyes were entirely normal in appearance. The fundi, however, evidenced a general pallor, the blood vessels being thin and appearing as a generalized net work throughout. Where the disc should normally be found there was a ring-shaped outline of brownish pigment much smaller than a normal disc.

D. H. O'Rourke.

12. VISUAL TRACTS AND CENTERS

Lindenmeyer, O. **Treatment of scintillating scotoma.** Klin. M. f. Augenh., 1927, v. 79, Nov., p. 602.

Lindenmeyer gave patients suffering from frequent attacks of scintillating

scotoma 0.1 gm. luminal every evening for from five to six weeks. Generally the attacks subsided at once. Rarely they occurred once or twice in diminished form.

C. Zimmermann.

NEWS ITEMS

News items in this issue were received from Drs. Arthur J. Bedell, Albany; H. Alexander Brown, San Francisco; Morris H. Clark, Kansas City; John H. Dunnington, New York; J. M. Patton, Omaha; G. Oram Ring, Philadelphia; George H. Shuman, Pittsburgh; F. T. Tooke, Montreal; M. F. Weymann, Los Angeles, and H. V. Würdemann, Seattle. News items should reach **Dr. Melville Black,** Metropolitan Building, Denver, by the twelfth of the month.

Deaths

Dr. Wallace A. Briggs of Sacramento died on November 27, 1927, in his eightieth year.

Professor Hjalmar Schiötz died December 8, 1927. (See obituary in this issue.)

Dr. Karl Hoor, professor of ophthalmology in Budapest, died December 15, 1927, in his seventieth year. He was the author of a textbook of ophthalmology in the Hungarian language.

Dr. Otmar Purtscher, formerly at the head of the Innsbruck clinic, and in his time one of the most successful and renowned ophthalmologists of central Europe, died December 12, 1927, almost seventy-six years of age.

Miscellaneous

Mrs. John O. McReynolds of Dallas, Texas, has offered a prize of $50 to that state auxiliary of the American Medical Association which secures the largest number of subscriptions to Hygeia.

Nominations will be received by the National Society for the Prevention of Blindness, 370 Seventh Avenue, New York, until May 15 for the fourth award for the Leslie Dana medal, presented annually through the Missouri Association for the Blind to the person selected from the nominations received by the National Society for the Prevention of Blindness. The conditions set forth in the deed of gift are as follows: (a) long meritorius service for the conservation of vision in the prevention and cure of diseases dangerous to eyesight; (b) research and instructions in ophthalmology and allied subjects; (c) social service for the control of eye diseases; (d) special discoveries in the domain of general science or medicine of exceptional importance in conservation of vision. The first Leslie Dana medal was awarded to Dr. Edward Jackson, Denver; the second to Miss Louisa Lee Schuyler, New York, and the third to Dr. Lucien Howe, formerly of Buffalo and now of Cambridge, Massachusetts. The award will take place during the annual meeting of the American Academy of Ophthalmology and Otolaryngology in St. Louis.

In a recent address Mrs. Winifred Hathaway, associate director of the National Society for the Prevention of Blindness, called attention to the personal and educational qualifications required for prospective teachers for sight-saving classes. According to Mrs. Hathaway, there are only three hundred sight-saving classes in the United States and Canada, while more than five thousand are needed, and behind this fact is the further difficulty that there is a scarcity of teachers with proper training and personal qualifications for this particular kind of instruction. Courses for the training of teachers of sight-saving classes are being given this year at the University of Chicago, University of Southern California (Los Angeles, California), and the University of Cincinnati.

The American Board for Ophthalmic Examinations (secretary, Dr. W. H. Wilder, 122 South Michigan Avenue, Chicago) and the American Board of Otolaryngology (secretary, Dr. W. P. Wherry, 1500 Medical Arts Building, Omaha) will hold examinations in Minneapolis on Monday, June 11, during the meeting of the American Medical Association.

Dr. John E. Weeks of New York addressed an informal meeting of oculists of Pasadena and Los Angeles at the office of Dr. W. H. Roberts of Pasadena on the evening of February 15. He also held a surgical clinic at the Pasadena Hospital on February 16.

The Eye and Ear Hospital of Los Angeles has sent out notice of its completion on February 1. It is located at Sixth and Lucas Avenue in the Eye and Ear Hospital Building. The building includes an out-patient department, which is open every day except Sunday. There is a staff of forty-two physicians, sixteen of whom devote time to working in the out-patient department.

The Guild of Prescription Opticians of America, Incorporated (Secretary's office, 1016 Pennsylvania Avenue, Brookline, Upper Darby P. O., Pennsylvania), will hold its annual convention in New York City May 31 and June 1 and 2, at the Hotel Plaza; and plans to have a joint meeting of eye physicians and dispensing opticians.

The American Optical Company has asked us to announce that on March 1 its Boston division and New England headquarters moved into new offices in the Studio Building, 110 Tremont Street, Boston. The previous location in the Malboro Building had been the home of the Globe Optical Company (now a part of the American Optical Company) since 1888.

Societies

Recently elected officers of the New York Ophthalmological Society are: Dr. Ellice M. Alger, president; Dr. Lewis W. Crigler, vice-president, and Dr. James W. White, secretary.

At the meeting of the Bronx County Medical Society held January 18, 1928, Dr. Bedell of Albany, New York, gave an address on "fundus photography—its value to the general practitioner, the specialist, and the patient."

Dr. George de Schweinitz was the guest of honor at a meeting of the New York Academy of Medicine on March 1, and gave an illustrated lecture on "the ophthalmoscopic changes seen in arteriosclerosis, diabetes, nephritis, and increased intracranial pressure."

Dr. Meyer Wiener of St. Louis and Dr. C. H. O'Brien of Iowa City were invited guests of the Sioux Valley Eye and Ear Academy in Omaha on February 15. Dr. Wiener spoke on "the surgical correction of deformity from third nerve paralysis." Dr. O'Brien demonstrated "the technique of regional anesthesia."

The Section of Ophthalmology of the College of Physicians of Philadelphia presented, on March 15, a program in which the following participated: Drs. J. S. Tassman and Luther C. Peter, Philadelphia; Arthur J. Bedell, Albany, New York; Francis H. Adler, J. Sperling, and S. T. Miller, Philadelphia.

The February meeting of the Eye and Ear Section of the Los Angeles County Medical Association was held in the clinic room of the Eye and Ear Hospital, and the corporation has invited the section to use this place as permanent headquarters. Drs. W. M. Gardner of Los Angeles, O. E. Ghrist of Glendale, and H. J. Profant of Santa Barbara were elected to membership.

In his retiring address as president of the Puget Sound Academy of Ophthalmology and Otolaryngology, Dr. H. V. Würdemann of Seattle congratulated the society on the success of its meetings. The attendance at these meetings has usually been over forty, and at one time as high as sixty-two. A great deal of excellent clinical material has been demonstrated, although there are no medical teaching centers in the Northwest.

On February 11, the Pittsburgh Ophthalmological Society gave a testimonial dinner in honor of Dr. Edward B. Heckel, who is serving his fifteenth consecutive year as its president. Guests of honor who attended included Dr. G. E. de Schweinitz, Philadelphia; Dr. Alfred Stengel, Philadelphia; Dr. A. C. Morgan, Philadelphia, president of the Pennsylvania State Medical Society; Dr. C. H. Henninger, Pittsburgh, president of the Allegheny County Medical Society; Dr. Samuel R. Haythorn, Pittsburgh, president of the Pittsburgh Academy of Medicine; Dr. L. H. Landon, Pittsburgh, president of the College of Physicians of Pittsburgh, and Dr. Thomas G. Simonton, Pittsburgh, president-elect of the Pennsylvania State Medical Society. The felicitations of the society were extended to Dr. Heckel by Dr. Edward Stieren. Dr. G. E. Curry, vice-president of the society, was toastmaster. Following the dinner a scientific meeting was held which was attended by about three hundred members of the medical profession. Dr. Alfred Stengel, of Philadelphia, spoke on "hypertension, arteriosclerosis, and renal disease, their relations and diagnoses." Dr. G. E. de Schweinitz discussed the subject from the ophthalmologist's standpoint, showing his excellent collection of fundus pictures by lantern projection. Dr. A. C. Morgan discussed the subject from the internist's standpoint.

Personals

Dr. Joseph Kimberlin of Kansas City, Missouri, is taking a vacation of several months in South America.

Dr. W. W. Blair of Pittsburgh, Pennsylvania, has had an extended vacation at Nassau, Bahama Islands.

Dr. Stanley Smith of Pittsburgh, Pennsylvania, has been on a cruise of the West Indies.

Dr. James Franklin Smith and Dr. E. D. Shortlidge, of San Francisco, have retired from active practice.

Dr. Walter Scott Franklin, of San Francisco, has moved to Santa Barbara, where he is enjoying his country place. He will have office hours in Santa Barbara.

Dr. E. V. L. Brown has given to the University of Chicago his library on ophthalmology.

Dr. and Mrs. G. Oram Ring recently spent a few weeks in Florida.

Dr. John Hooval announces the removal of his office to the C. C. Chapman Building, Los Angeles.

Drs. Frank Detling, Harry Miller, and Simon Jesberg are now permanently located in the new Eye and Ear Hospital Building, Los Angeles.

Dr. Julian Dow of Los Angeles is now limiting his practice entirely to ophthalmology and after March 1 will have offices in the Roosevelt Building.

Drs. A. Ray Irvine, M. N. Beigelman, and W. A. Boyce of Los Angeles have changed their location to the Roosevelt Building.

Dr. A. E. MacDonald of Toronto recently spent a few days in Montreal as the guest of Dr. and Mrs. W. G. M. Byers.

Drs. Finnoff and O'Rourke, of Denver, have dissolved their partnership. Dr. O'Rourke is spending a couple of months in the East.

Dr. A. S. Schneider of Plattsburg, New York, visited Montreal recently, for the purpose of attending the last meeting of the Montreal Ophthalmological Society, and was the guest of Dr. F. T. Tooke.

Dr. Harry V. Würdemann, of Seattle, as colonel in the Medical Reserve, was at the U. S. Army School of Aviation Medicine, Brooks Field, Texas, during the month of March.

Dr. J. B. McPherson of Hastings, Nebraska, has just returned from several months of study in Europe.

A letter from Dr. Charles A. Bahn of New Orleans tells of a very delightful visit to the clinics in Prague and other European cities. He was especially interested in keratoplastic work shown in the Elschnig clinic.

Dr. Peter Kronfeld, assistant in the Meller Clinic, is at the University of Chicago as assistant professor under Dr. E. V. L. Brown; having obtained a year's leave of absence from Vienna.

Dr. and Mrs. Luther C. Peter will spend the month of April in California, going by way of New Orleans. Dr. Peter will attend the joint meeting of the Pacific Coast Oto-ophthalmological Society and the Western Section of the American Laryngological, Rhinological, and Otological Society at Santa Barbara, April 18 to 21. He will present before the former society a paper on his personal experience in "the relative value of glaucoma operations and their special indications"; and will address the physicians of San Diego on "concomitant squint."

THE INTERNATIONAL OPHTHALMOLOGICAL CONGRESS, 1929

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Third List

Societies, Institutions, etc.

Archivos de Oftalmologia Hispano—Americanos
British Medical Association
Czecho-Slovakian Ophthalmological Society
Japanese Ophthalmological Society
Oxford Ophthalmological Congress
Royal Westminster Ophthalmic Hospital
Section on Ophthalmology, College of Physicians of Philadelphia
Ophthalmological Society of Egypt
Ophthalmological Society of Valparaiso

A group of German ophthalmologists, by favour of Geh. Hofrat Professor Dr. Th. Axenfeld.

Individuals

Ask, Fritz
Chaillous, J.
Cirincione, Giuseppe
Cirincione, Speciale
Cozzoli, Giulio
Dalén, Albin
Fileti, Antonio
Finnoff, Wm. C.
Gomès, Pereira
Ishihara, Shinobu
Lo Cascio, Girolamo
Luppino, Andrea
Maggiore, Luigi
Margotta, Giuseppe
Oguchi, Chura
Ovio, Giuseppe
Picciche, Speciale
Radcliffe, McCluney
Roselli, Romeo
Sartain, Paul J.
Snell, H. C.
Terrien, F.
Velez, Daniel M.
Wardale, J. D.
Zappalà, Antonino

Papers of special interest: The papers here listed have been read by members of the editorial staff and collaborators, or attention has been called to them by readers. They seem worthy of bringing to the notice of ophthalmologists in general, although some of them cannot be abstracted or reproduced to advantage. Any reader who wished to become acquainted with all that is written on a particular topic should go over the Cumulative Index Medicus, published by the American Medical Association, and check the titles of articles that refer to the subject or subjects in which he is particularly interested. It is hoped that this brief list of important papers and monographs will be more helpful to the mass of readers than the longer lists. *E. J.*

Chavasse, Jones, Holmes, and Scott. Discussion on nystagmus. (Bibl.) Tr. Ophth. Soc. United Kingdom, 1927, v. 47, pp. 1-23.

Clegg, J. G., and others. Etiology and treatment of hypopyon ulcer. Tr. Ophth. Soc. United Kingdom, 1927, v. 47, pp. 24-80.

Gerard, G., and Delescluse, C. Injections of eighty percent alcohol for trigeminal neuralgia. Clin. Ophth., 1927, v. 31, p. 663.

Mulock Houwer, A. W. Filamentous keratitis and chronic arthritis. (3 ill.) Klin. M. f. Augenh., 1928, v. 80, pp. 10-21. Trans. Ophth. Soc. United Kingdom, 1927, v. 47, p. 88.

Patton, J. M. Hypophyseal tumors in relation to eye and nose. (Bibl.) Tr. Pacific Coast Oto-ophthalmological Society, 1927, pp. 71-94.

Wibo, M. Fistulizing sclerectomy of Lagrange in rodent ulcer of cornea. Bull. de la Soc. Belge d'Opht., 1927, no. 55, p. 9.

Wilmer, W. H. Results of operative treatment of glaucoma. (24 ill. bibl.) Tr. Ophth. Soc. United Kingdom, 1927, v. 47, p. 230.